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hinking small.

When we introduced Microsoft® Word six years ago, we weren't planning on making history.

We had just one goal, and a fairly simple one at that: to make a word processor that suited people's needs.

Then again, we knew that the people we wanted to suit were a wildly diverse, independent lot: Mac® users. So it made sense to let them tell us exactly what to put into Word.

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First, there were some folks who didn't like tabbing much. Fair enough. For them, we developed Tables—an easier way to set up side-by-side paragraphs, columns of numbers, even forms. No tabs. No hassle.

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Our goal is still simple: to make Word the best word processor around. With the latest technology—translated into human terms, of course.

After all, we're only making history because we make word processors the way you like 'em.

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You do it by t

You don't become the most popular word processor in Mac history by thinking big.

MacUser

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Erasable Optical Drives

BY JOHN RIZZO AND THE MACUSER LABS STAFF

If your hard disk runneth over with data, it's time to take the plunge into optical storage. Erasable optical drives squeeze hundreds of megabytes onto a single cartridge; when the cartridge is full, you simply pop in a new one. For file-server and data-archiving applications, optical storage is quickly emerging as the most cost-effective solution. In its look at 20 optical drives, MacUser Labs discovered that prices and performance have improved so much that the question is not so much whether you should buy an optical drive but which optical drive is the right one for you. **102**

Affordable, Laser-Quality QuickDraw Printers

BY KELLI WISETH AND THE MACUSER LABS STAFF

When your ImageWriter isn't enough but a PostScript laser printer is just a little bit beyond your budgetary means, consider one of these capable QuickDraw laser-quality printers. MacUser Labs tested the Apple Personal LaserWriter SC, the GCC PLP IIS, and the Hewlett-Packard DeskWriter; all three printers install easily, print swiftly, and produce surprisingly good print quality. Find out which is best for you. **134**

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BY MINNA LEVINE AND LINDA CUSTER

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Clip Artistry

BY AILEEN ABERNATHY AND SALVATORE PARASCANDOLO

If you can't draw a straight line — even armed with the latest and greatest drawing software — you've probably already discovered the many possibilities of ready-to-use clip art. Even skilled illustrators — when ominous deadlines loom — know the value of a well-rounded clip-art library. But clip art is more than just visual Muzak — once you've learned a few tricks for transforming canned art into unique graphics. Here's how to choose, use, and edit clip art, including top packages from companies such as Adobe, Artbeats, Dynamic Graphics, Image Club Graphics, Metro ImageBase, T/Maker, and 3G Graphics. **168**

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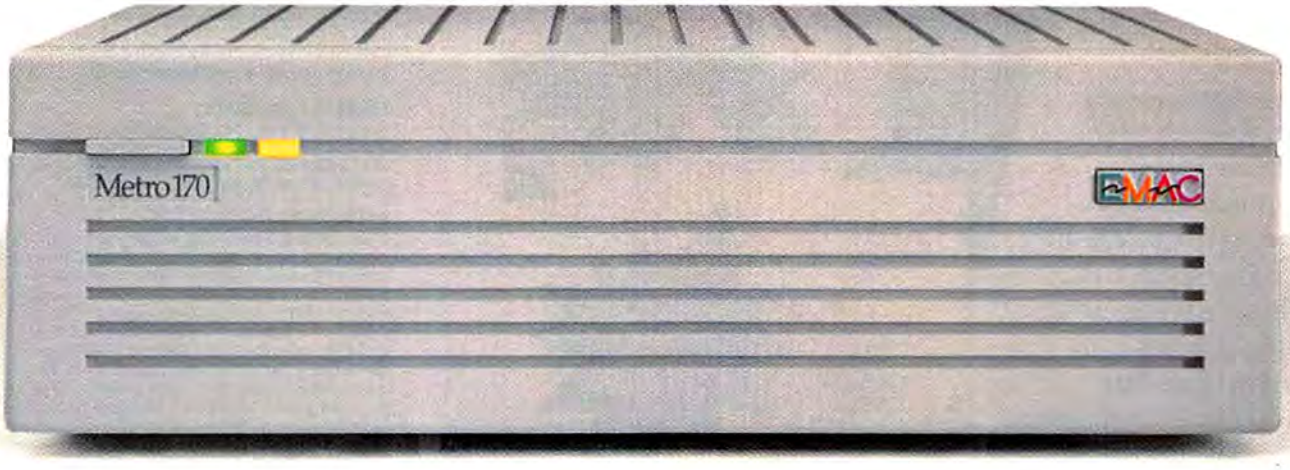

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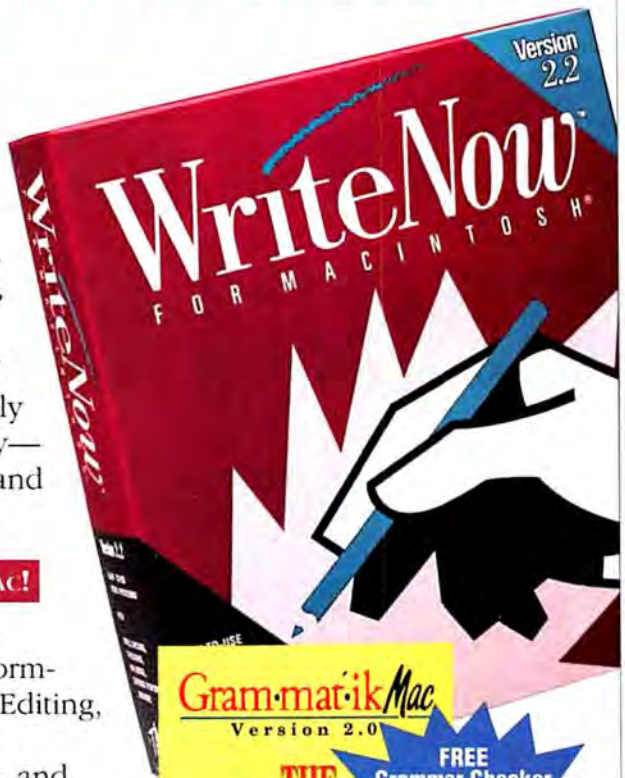

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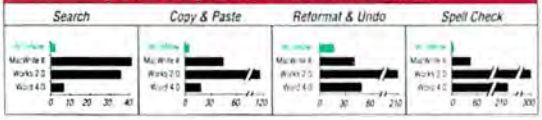

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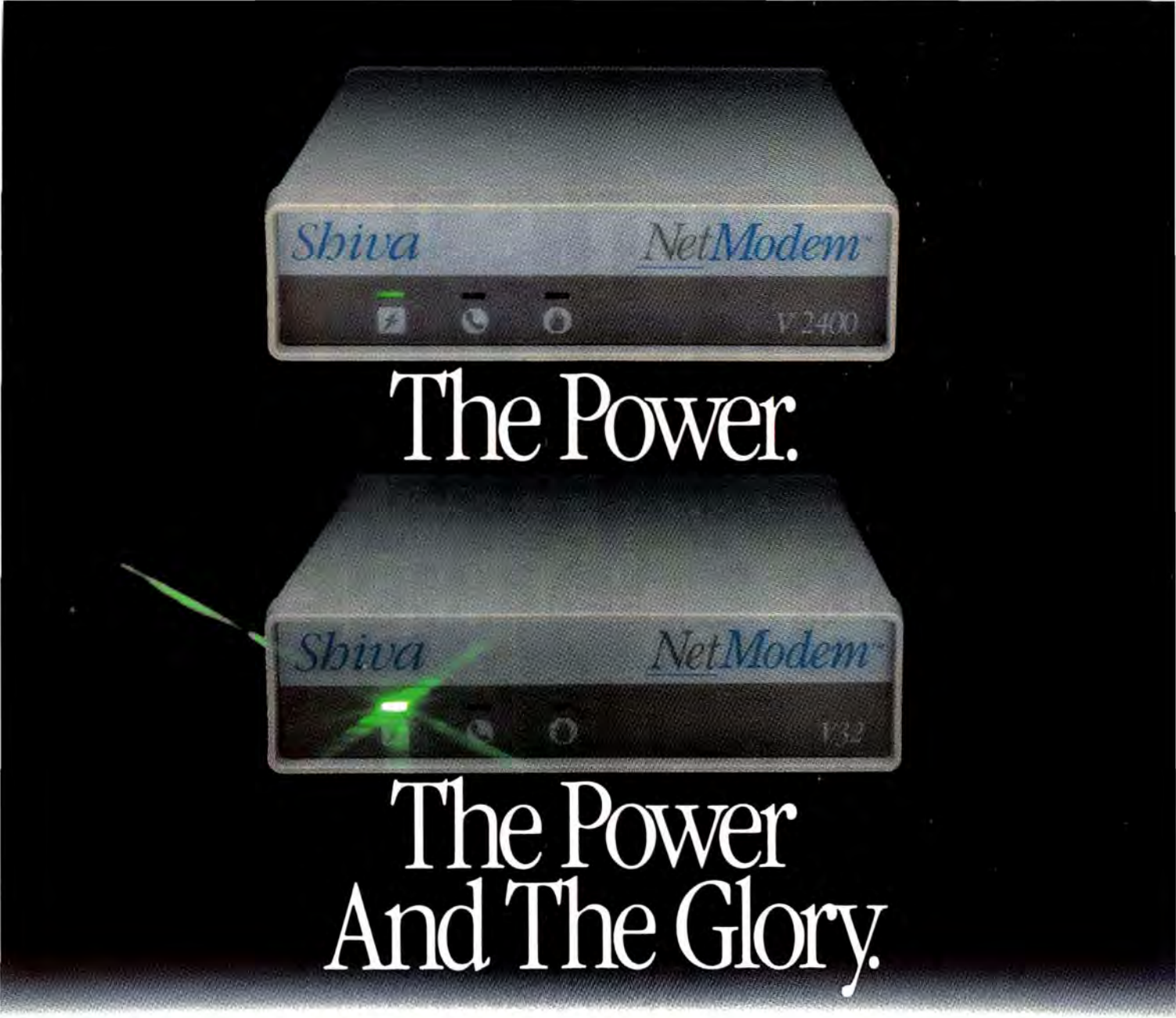

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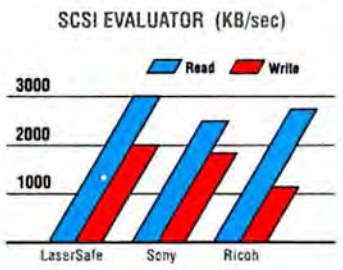
With the new LaserSafe, a fast MO is no longer an optical illusion. In addition to a 256KB, on-board, dual-ported caching system, LaserSafe utilizes an advanced technique called "asynchronous write." By freeing the Mac from waiting for the write operation, LaserSafe can nearly double your throughput. An Iomega first that raises the level of MO performance, making LaserSafe the fastest MO for your data-intensive storage applications. The difference is clearly visible.

The LaserSafe is a 650MB optical drive that's actually easy to use, too. It allows you to partition disks for easier file management. And it's the first MO that gives you off-line disk formatting, saving you up to 40 minutes per disk of otherwise wasted time. But more important, LaserSafe uses the same simple software interface for which Bernoulli is known.



LaserSafe was designed with an attention to detail unlike any other MO. Worldwide agency approvals, a sealed mechanism and positive airflow filtration set the industry standard for reliability and data integrity. And LaserSafe has convenient, external termination, 110/220 voltage switching and SCSI ID — no panels to open, no resistors to remove, no hassles.

Above all, LaserSafe is made by the company that wrote the book on removable storage. The company that has an installed base of over 600,000 drives with 98 percent customer satisfaction. A company that will be there to support you in the future.

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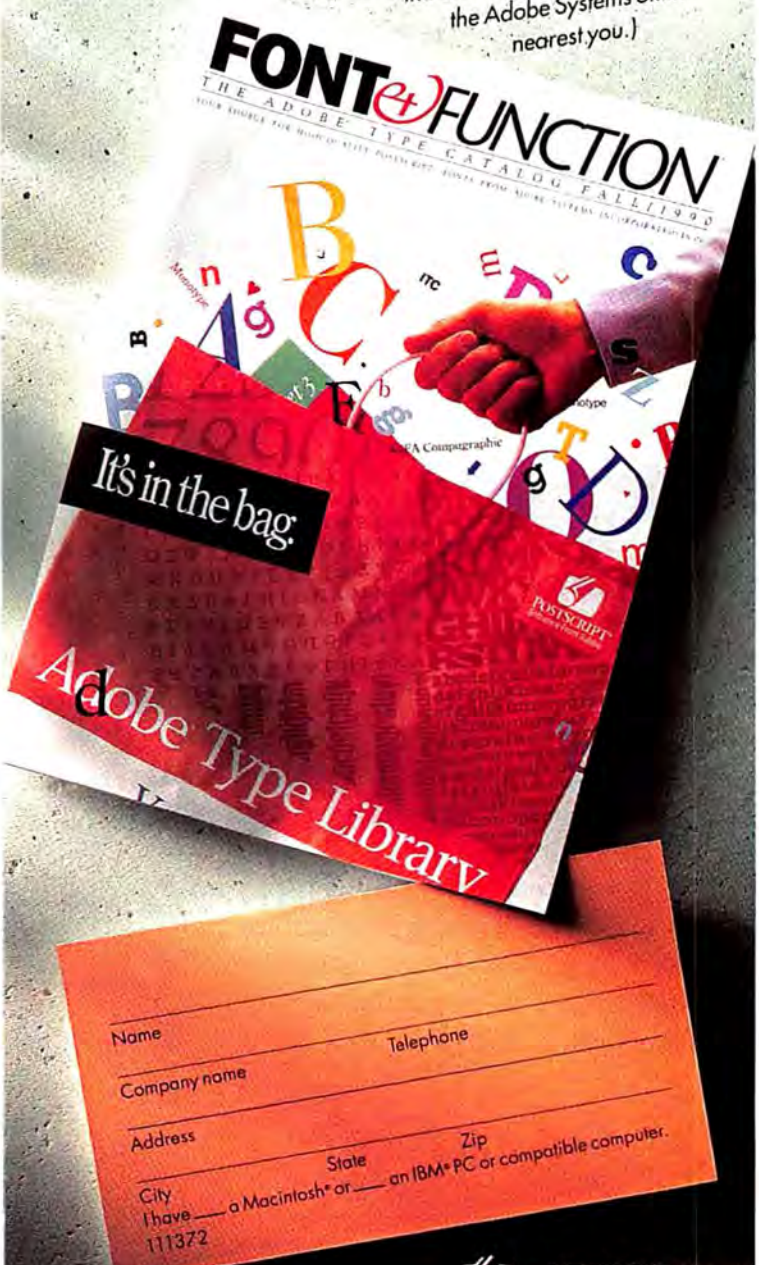

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About **MacUser**

Shooting Engineers

Every article in *MacUser* is shooting at a moving target. Take the MacUser Labs optical-drive comparison in this issue, for example. No sooner had we readied the story for press than the fourth annual Rothchild Conference on Optical Drive & Media Technology rolled around — and MacUser Labs associate project leader Paul Freedman was among the staff in attendance. This is good, because we like our staffers to stay plugged into what's happening. This is bad, because Paul came back wanting to improve things in the optical-drive story.

We reminded Paul of the old saying "There comes a time in the history of any project when it becomes necessary to shoot the engineers and begin production."

MacUser Labs' associate project leader Paul Freedman has a magneto-optical personality.

Unfazed, Paul asked if he could add just a few notes about optical-drive and mass storage to this column. Here are some of his observations.

Optical discs are in short supply, which keeps their prices high. First-generation optical discs (ISO Standard A) have a low yield rate, because they store data on a single spiral track, and a flaw anywhere along that track ruins the whole disc.

Fortunately the optical-drive industry is gradually shifting to ISO Standard B, which uses concentric tracks that let the software sidestep bad sectors.

Paul said conference attendees were concerned about slow access times. Optical drives have oversized read/write heads that are burdened with a laser and a focusing lens. This means the heads can't move over the disc surface as quickly as lightweight hard-disk heads can.

One of the ways the speed problem is being addressed is by downsizing from 5.25-inch to 3.5-inch discs that require less head movement.

These problems notwithstanding, Paul's enthusiasm for optical drives was supported by the conference. He predicts that optical drives will progressively supplant hard-disk drives for storage, because developers have just scratched the surface of optical-disc density, whereas hard-disk densities are approaching their theoretical limits.

He did see one disquieting demonstration, however. Hewlett-Packard showed a magneto-optical drive with a special chip that lets you select a specifically coded disc such as a WORM disc. A WORM disc's unalterability is valuable for legally significant data such as tax records. Paul was concerned about the potential alterability of such discs if a hacker circumvented the special chip's instructions.

We told Paul we couldn't put all this in About MacUser. But you see what happens when you tell one of our Labs experts something is impossible . . . .

The Mac SQL Sequel

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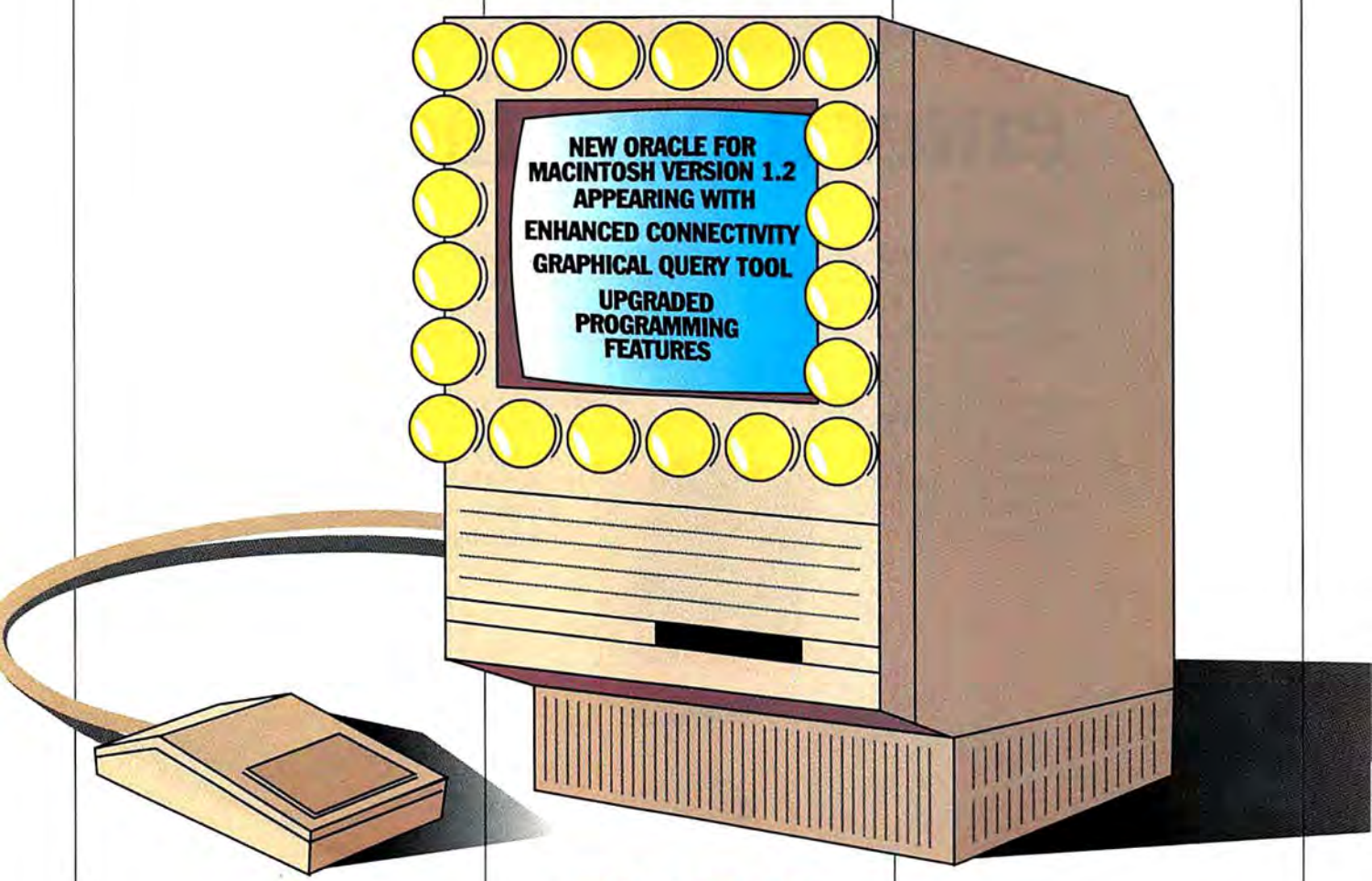

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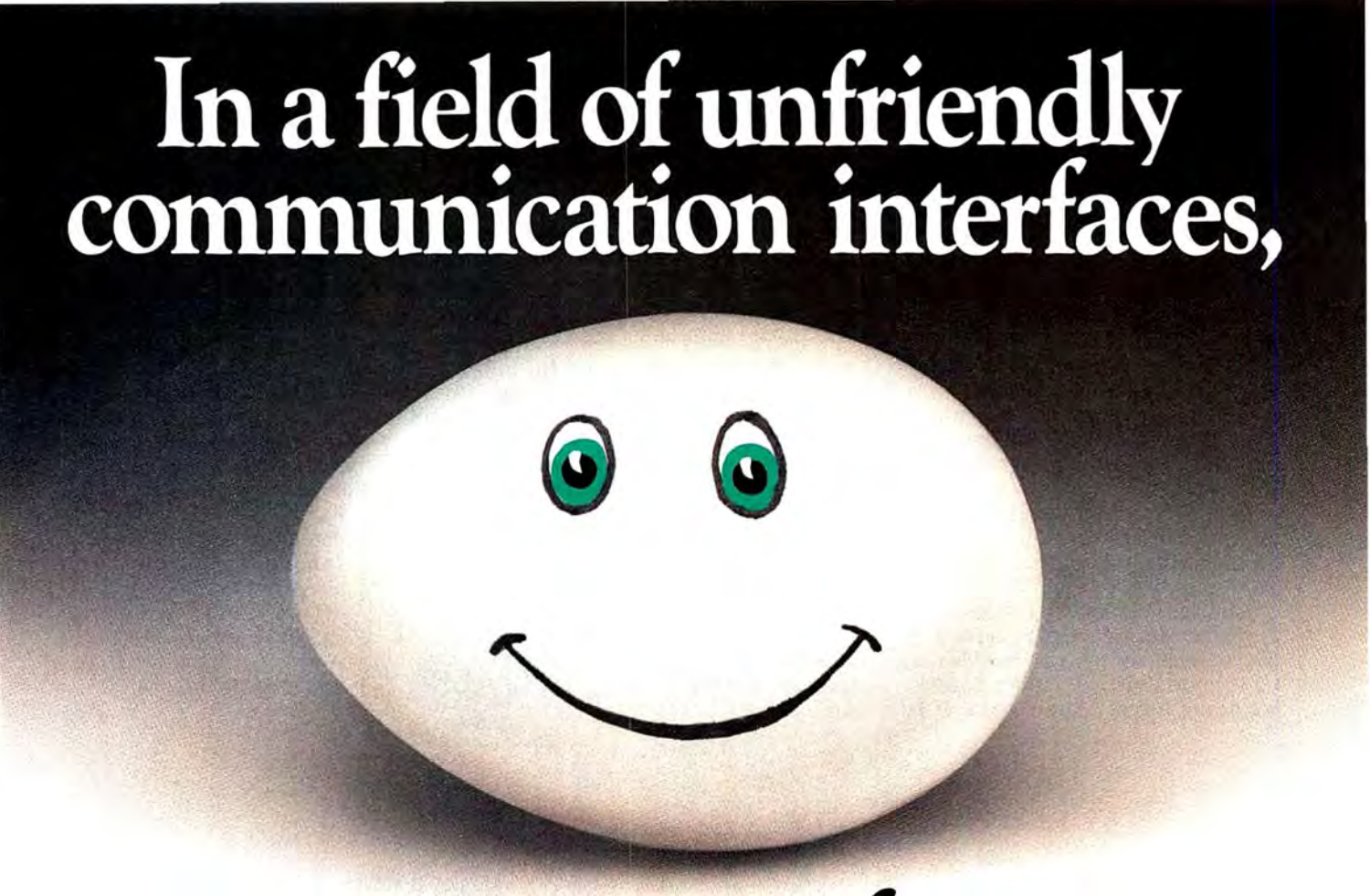

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LETTERS

Peter A. Janick of Baltimore, Maryland, enjoyed Guy Kawasaki's "Macintosh Rules of Thumb" (StartUp, August '90, page 44), but he was puzzled about why Guy "neglected the most important rule of thumb: The amount of productive work done by a Mac user is inversely *related to the number of installed fonts times the number of INITs loaded at startup of the Mac." Perhaps that explains why Apple tried to limit the number of installable DAs to 15 and is revamping them completely in System 7.0.*

✉ Write to: Letters to the Editor, c/o MacUser, *950 Tower Lane, 18th Floor, Foster City, CA 94404.*

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Key Issues

In his August column (page 328), John Dvorak asks, "Why develop something for a dying breed of people who can't use a keyboard?" In context, he seems to have meant this as a rhetorical question, referring to people who can't or won't take the time to learn how to type.

Actually, there happens to be a very much living breed of people who can never use a standard keyboard — people, such as quadriplegics, with some types of motor-control disabilities. And, of course, there are many persons with carpal-tunnel syndrome and other wrist disabilities that by all odds were caused in the first place by using a keyboard. I know several people who fit into these categories. Contrary to Mr. Dvorak's assumptions, I can't count a single Neanderthal among them.

Jane Berliss
Madison, WI

Guy and God

It was refreshing to read Guy Kawasaki's "Praise the Macintosh" (August '90, page 41). Contrary to some notions, all Christians are not money-greedy charlatans. Some Christians are actually decent folk — no less capable of worthwhile achievements than the rest of humankind. A number of us even use computers . . . and read *MacUser*.

Special thanks to Guy for having the decency to call things as he sees them. (And tell him to cheer up! . . . He is probably not as anonymous among Christendom as he thinks.)

Bruce Levert
Compton, CA

Guy Kawasaki's very creative and interesting article about our Billy Graham School of Evangelism in Albany, New York, was fun to read.

Guy will be pleased to know that several people sent copies of his article to me — including some Mac users in our office. So his columns are read by a great many people in Christian ministries!

P.S. We will pray that System 7.0 ships bug-free!

Larry Backlund, Assistant Director
Billy Graham School of Evangelism
Minneapolis, MN

Proof Positive

I'd like to compliment the proofreaders and copy editors of *MacUser* for a job well done in maintaining good use of the English language. I often notice sentences that could be very conducive to common (but usually trivial) errors in usage, yet these are usually handled perfectly correctly.

Understanding Mac computing and conveying this information as well as you do for *MacUser* is impressive.

Robert D. Chapman
West Covina, CA

A Reviewing Stand

Guy Kawasaki's column on "Reviewing Reviews" (July '90, page 41) was timely and well put. As a former *InfoWorld* reviews editor, I understand his concerns completely. Publications would be wise to heed his suggestions, especially regarding consistency and completeness.

One problem the article cites is inaccuracy. Unfortunately, there is no corresponding remedy suggested for it. In my experience, two key factors help ensure accurate reviews.

The first is for vendors to publish reviewers' guides that accompany software or hardware and to send them with any product destined for review.

The second is for a publication to call the vendor to check facts before the review is published. Simple as this sounds, many publications don't do it. It doesn't require giving out subjective information, scores, or opinions but rather focuses on features or double-checking benchmarks that appear incorrect. I've made hundreds of such calls, and they certainly pay off.

Serge Timacheff
Logitech, Inc.
Fremont, CA

Car Talk

When Paul Somerson compares IBM machines to American cars and the Mac to Hondas and BMWs ("Windows Watchers," August '90, page 25), I think he's making a poor analogy. The Mac is like a BMW but not like a Honda. Honda entered the market by providing cheap, well-made transportation. People bought them in droves, and Honda responded by upgrading the quality of the cars and making them a little bit upscale. Honda's prices for the Civic and Accord remain competitive with those of domestic models, however.

BMW, on the other hand, remains a luxury car. I just bought a Ford Taurus, and I didn't see enough added value in something such as a BMW to justify parting with a lot of extra bucks. I'm not knocking BMW; its car may be significantly better than my Ford but not enough that I would pay thousands of extra dollars for the privilege of owning one.

Had Apple pursued the Honda strategy, the Mac might be going neck and neck with IBM machines right now. My decision on what car to buy was between a Taurus and an Accord,

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not between a Taurus and a BMW. As long as Apple wants to get a significant price premium, it will remain a luxury product to most people, as a BMW is. To those who argue that the SE and Plus are relatively cheap, I would counter that so are five- and six-year-old BMWs.

Mark Guttag
Bethesda, MD

Broken Windows

In response to Paul Somerson's column on Win3 (August '90, page 25).... Is it a window of vulnerability? I don't think so. As a new Mac SE/30 user, I am very familiar with Windows 2.0 as well as with Win3.

When I first saw Windows, my interest was piqued because of its contrast to the drab and lifeless DOS interface used by so many software packages. In my case, I found out what the Mac was all about by first dipping my feet into the Windows pond. The problem is that once you get used to the water, you notice that the Windows pond is rather shallow.

There were so many things I wanted to be able to do in Windows that I couldn't. Don't misunderstand me, Win3 is a good product for some people. But where I work, it's like pulling teeth to get anyone to even look at a Windows application.

I think the hoopla given to Windows may backfire when people plunk down the cash for more RAM, a 20-inch monitor (useless in my opinion), and (for some) a first mouse, only to find that they still can't accomplish as much as their secretary does with a Mac.

Kevin Sauter
Dallas, TX

My biggest problem with Windows is when things go wrong. I could probably tell you 20 ways to crash it. Until today, the worst crash happened a few weeks ago and left my FAT table (file-allocation table, for those of you lucky enough not to have to know DOS) with my COMMAND.COM file pointing at one of my data files (try deleting the Finder, renaming your Word document Finder, and putting it in your System Folder to get an idea).

But that was nothing compared with today's crash. I was working on a series of documents when I got the standard Windows error message saying that the System had been corrupted. So I thought, "Here we go again..." and tried to reboot. Once again, I got the DOS "not a system disk" message, so I booted from a floppy and did a directory on my hard disk, only to find a bunch of files with strange characters for filenames.

It seems that Windows had somehow

Dear Mr. Sculley . . .

Readers' **marketing slogans** for Apple continue to pour in. This time we promise to print some good ones, relatively speaking. Allan H. Gael of San Anselmo, California, sent three pages of impassioned prose that culminated in "The Future Is Here. Macintosh." Perhaps anticipating our yawn, he supplied an alternative: "MacEasy. Macintosh."

"Once you go Mac, you never go back," swears Elizabeth Bodnar of Sault Ste. Marie, Ontario, Canada. Her suggestion found favor with repentant DOS types around the office, but our favorite suggestion came from Mark W. Hervick of Kent, Washington: "Because Apple plans to produce (finally) a low-cost Macintosh, I think the new slogan should be: Fanfare for the Common Mac! (with apologies to Aaron Copland!)."

Finally, one dissenting view from Ralph Megna of Riverside, California: "Frankly, I think the 'Power to be your best' campaign still has some life in it. Apple needs to explore how the ease of setup and operation contributes to doing your work (or pleasure) faster and better."

Apple's always sold the Mac with the promise that it offers power and ease of use. As the power has increased, though, the ease of use hasn't necessarily kept pace. Just ask anyone who's tried to hook up more than three SCSI devices to one Mac.

Speak Up: When is the Mac's ease-of-use not so easy?

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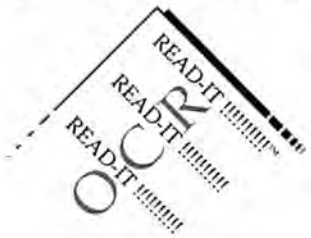

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overwritten the aforementioned FAT table. The hard disk is trashed — all my programs are lost. I'm not sure what caused this (aside from the fact that IBM PCs and I do not get along — they must know I have a Macintosh at home), but I will *not* be using Windows again in the near future.

Richard W. Martin
Raleigh, NC

Outlining Solutions

I just finished reading with great interest your August '90 article entitled "Capturing Font Outlines" (page 210). I was glad to see an article dealing with the topic, as I haven't seen one before.

Of your nine solutions, however, not one used my method. I use LetraStudio (a program superior to TypeStyler), Adobe Illustrator 88, and some method of PostScript printing (because you're dealing with capturing PostScript outlines). LetraStudio 1.5 lets you save any file in Illustrator 1.1 native format. Enter what you need (even the whole font set) in LetraStudio, accomplish any type manipulations, and choose the Illustrator 1.1 format option in the Save dialog box. You can open this file in Illustrator and have editable outlines!

Damion Desai
Redondo Beach, CA

At the time the article was written, LetraStudio 1.5 and FontStudio had not been released. The previous version of LetraStudio did not support Type 1 or Type 3 fonts. Two other products not mentioned in the article, Altsys' Fontographer and Image Club's Evolution, can also create outline fonts. Although both Letraset products can produce font outlines, their price precludes buying them for that task alone. In addition, LetraStudio's outlines have a large number of control points, which makes editing difficult. — AA

Future Perfect

Apple should bring out the following products:

A $700 16-megahertz 68000 machine with a single SuperDrive, a SCSI port, and a port (with built-in circuitry) for a larger monitor. Two megabytes should be standard. It should come in a compact Mac case.

A $1,200 16-megahertz 68000 machine with a single SuperDrive, a SCSI port, a built-in color monitor (with provisions for a second monitor). Two megabytes should be standard. It should come in a compact Mac case.

A $2,000 16-megahertz 68030 machine (with math coprocessor), a single SuperDrive, a SCSI port, built-in support for a color monitor, and three NuBus slots. Four megabytes should be standard, and this model should be in a IIcx case.

And here's a lightweight model: a $3,000 16-megahertz portable Mac — and Apple should license the ROMs to Toshiba for manufacturing.

Perhaps licensing the ROMs to a select group of companies would be the way to go. Just look at the money that Adobe makes from PostScript royalties!

Stephen Caldwell
Wurtsmith AFB, MI

Apple hasn't gone so far as to license ROMs yet, but it did recently reach an agreement with Outbound Systems of Boulder, Colorado, concerning that company's Macintosh-ROM-based portable machine. — JB

The Envelope Plea

In the September '90 Tip Sheet (page 349), Michael Conley supplied a tip about using SuperGlue to fool our product KiwiEnvelopes 3 into producing output for a dot-matrix printer.

Tests administered in close cooperation with the U.S. Postal Service indicate that dot-matrix printers cannot position a print job precisely enough to produce valid bar codes. We disabled the bar-code feature for dot-matrix printers deliberately, and this is documented in our manual.

A bad bar code makes your mail move more slowly through the postal system than no bar code at all.

Pete Gontier
Kiwi Software, Inc.
Santa Barbara, CA

SCSI Headaches

As a big fan of your magazine — which has saved me lots of money and solved several nasty technical problems — I still say your technical people have been dodging the toughest technical problem out there: SCSI issues. Thank God you had the hair to publish Thom Hogan's article ("A Beginner's Guide to Daisy Chains," August '90, page 243). The accompanying graphic caught the state of the art perfectly. What good's another speedy peripheral if you can't hook it up?

Because you have knowledgeable technicians, please put more time and

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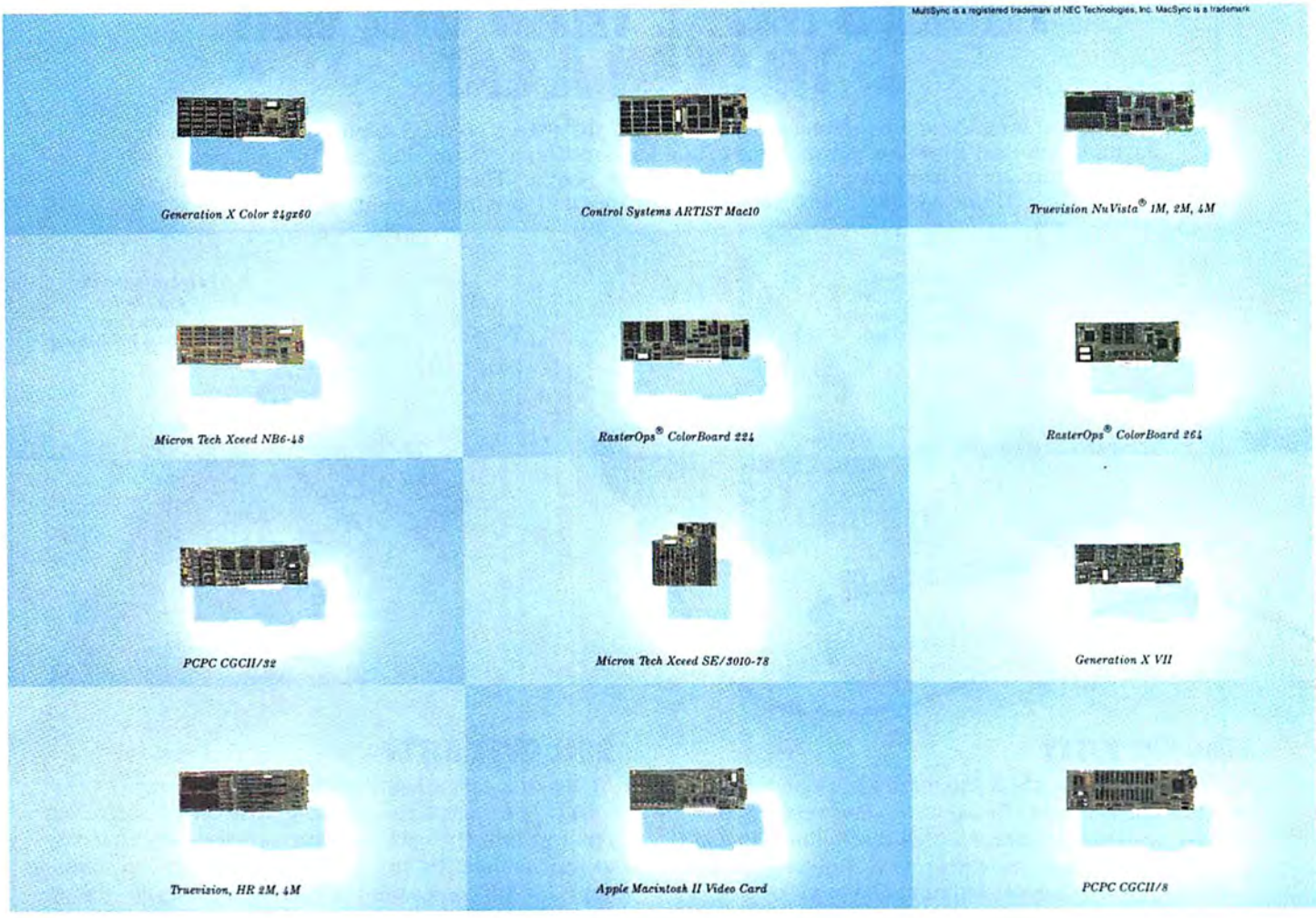

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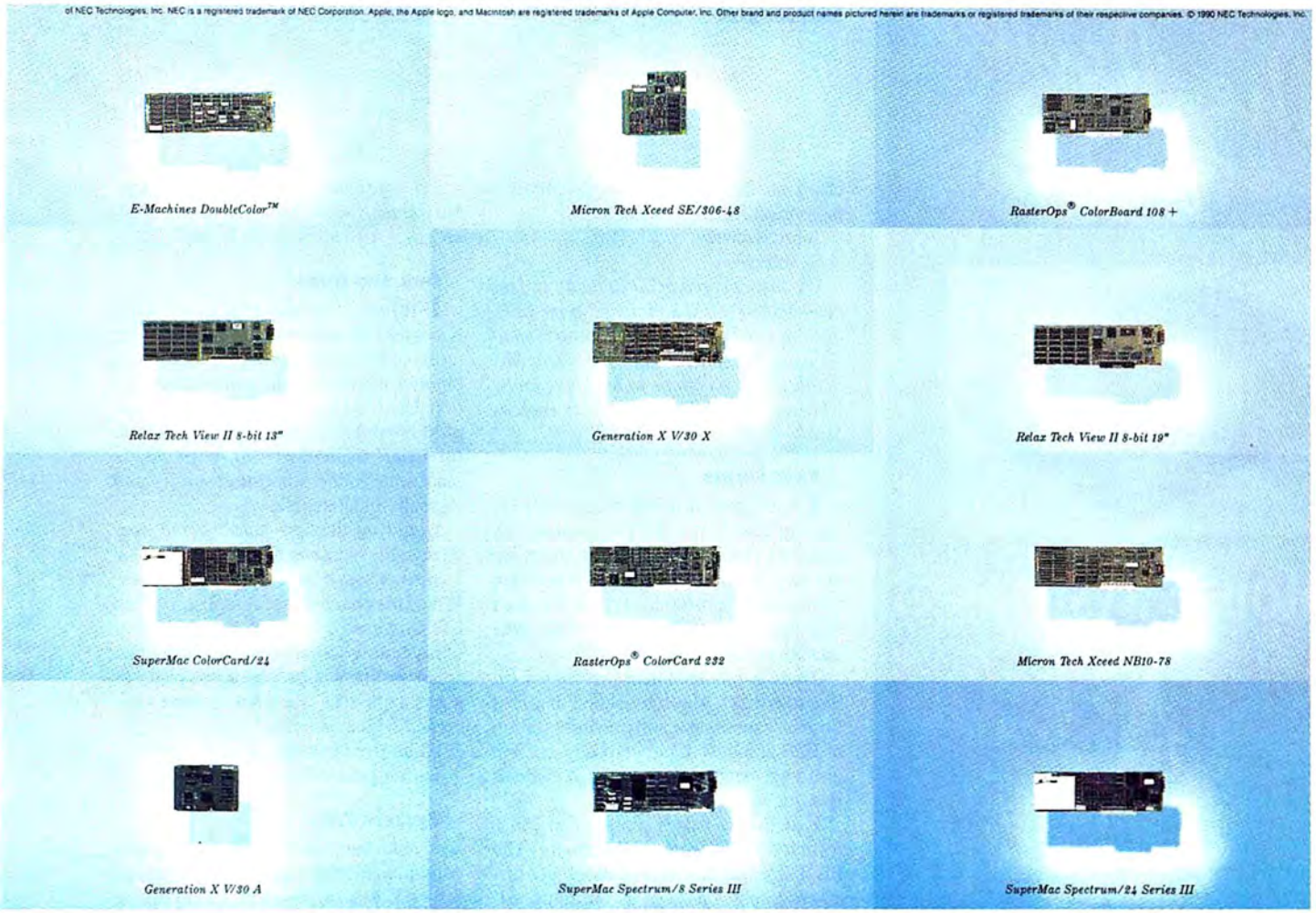

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effort into finding logical, consistent ways to connect SCSI devices.

John Sweeney
Seattle, WA

We last covered SCSI in depth in December '89 ("SCSI Solutions," page 229), but you can be sure we'll be returning to the topic. In the meantime, see "Dear Mr. Sculley" for a chance to let Apple know what you think about standards such as SCSI. — JB

Fast Forms

I was pleased to see *MacUser*'s review of Fast Forms 2.0 (September '90, page 73). Our research confirms that there are two types of Mac users who have forms needs: professional form creators and those who need forms to make their business more efficient.

There is one technical inaccuracy I'd like to correct. *MacUser* stated that Fast Forms "cannot deal with the importation of EPS graphics. It converts any graphic into a bit-mapped image when it places it in a document."

Fast Forms pastes graphics in PICT format directly from the Clipboard. The PICT format can represent object-oriented graphics as well as bit maps. Although the PICT is displayed as a bit map on-screen (72 dpi), when you print it, Fast Forms uses the available resolution of the printing device.

Steve Schaffer
Power Up Software
San Mateo, CA

First-Class Mail Order

I see many letters complaining about a vendor's service or support, so I thought it might be nice to send you something positive for a change.

MacBEAT, a new mail-order house, specializes in just one thing: letting the Mac make music. Its prices are as low as, or lower than, those of the major mail-order houses for music software, but the real reason to deal with it is support. It does not just take your order and ship it. The staff members point out programs that handle what you want to do. Twice they steered me away from programs I thought I wanted to ones that were cheaper and still did everything I needed. How often has your favorite mail-order house gone out of its way to save you $100?

James G. Haberly
Mission Hills, CA

Not very often — which is one reason why we'll be focusing on how to be a smart consumer in an upcoming issue. Maybe then we'll get more letters from satisfied customers. — VvB

Guy and Guns

I think it presumptuous of Guy Kawasaki to assume that all (or even most) of his readers will identify with his bigoted views regarding the NRA (National Rifle Association). His comparison of Microsoft to the NRA ("It's a Windowful Life," September '90, page 33) is inaccurate to the point of absurdity and logically indefensible.

I hold no illusions that I could ever change his opinions on the gun issue, so I will not waste time on that endeavor. What I may be able to accomplish, though (if I am joined by a great enough number of my fellow subscribers), is to keep that sort of political nonsense off the pages of a magazine that is supposed to be concerned with *computers*.

Allan Breitenbach
Farmington, NM

System 7.0 . . .

I read with interest Thom Hogan's column in the September '90 issue (page 321) but was surprised to see no option for partitioning your hard disk to run Systems 6.x and 7.0 on different partitions.

I recently installed a 120-megabyte hard-disk drive in my SE/30; bought LaCie's SilverLining; and partitioned my drive, anticipating running each System on a different partition.

Is this not a preferable way to do what you recommend?

Larry Anderson
Largo, FL

We asked Thom the same question when we first read his column. He referred us to his first column for MacUser *("The Case of the Quirky Computer," March '90, page 211), where the ultimate culprit for a nightmarish sequence of system crashes turned out to be disk-partitioning software.*

Thom doesn't recommend this approach while you're breaking in System 7.0. — JB

. . . and Counting

System 7.0 seems to be vaporware to the same extent that FullWrite was. I found the first reference to System 7.0 in the August '89 *MacUser!* We've since had a full year of issues telling us of how System 7.0 is the greatest thing since sliced bread. Whatever happened to the

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LETTERS

MacUser pledge of not reviewing something until it was released?

Of the features that have not yet been dropped from System 7.0, how many are really useful and *significant* advances from where we are now? Is virtual memory really helpful? I have a Mac IIci with 8 megabytes of memory and haven't run out of memory. Virtual memory stores things on-disk, and disk is slow. I, for one, don't want to sit around and wait for the disk to access during a spreadsheet calculation!

If I have something on my Macintosh that needs more than 8 megabytes of memory, then I know my Mac is too small a machine and that I need to use my mainframe. Likewise, if a calculation takes more than half an hour, I should use my mainframe.

I have yet to see much use in all the so-called nifty features of System 7.0. Furthermore, I plan to wait for at least a year until most of the bugs have been sorted out before I even install it.

Alan Touchberry
Saint Louis Park, MN

We haven't reviewed System 7.0 yet and won't do so until it is released as a shipping product, which Apple currently says will be in December 1990. And, if it all works as promised, System 7.0 will be the most significant Mac operating-system upgrade to date. Besides providing a better Finder, System 7.0 will improve the applications we buy. For example, interapplication communication will allow linking of programs from different vendors, and the Communications Toolbox will create a consistent plug-and-play interface for communications software.

As for virtual memory, I can remember a time when people said, "128K RAM: I'll never need that much memory!" Macintosh applications show no signs of slowing their memory-size inflation. You can continue to use your mainframe if you wish, but most users find it easier (and quite a bit cheaper) to use their Macs. — JR

Knight Line

The Bobker's Dozen review of ZTerm in the September '90 issue (page 39) says that the Zmodem protocol is supported only by ZTerm and MicroPhone II. Not so — White Knight also supports Zmodem.

James W. Walker
Columbia, SC

Worth the Weight

As a consultant and busy owner of a graphic-design/desktop-publishing business, I've developed a fast system for reading through the volumes of Mac-related periodicals to which I subscribe. *MacUser*, being one of my favorite publications, usually gets an immediate read through, but your September '90 issue was a killer. That thing was so full of useful information that I found myself reading features while talking to clients on the phone.

When I first pulled the September issue from the mailbox, I joked with my assistant about its weight ("What's in here, an encyclopedia?"). How refreshing to find that the extra weight was predominantly due to more pages of relevant editorial and not a 50-page mail-order-house insert.

A.M. Concepcion
Chicago, IL

RagTime Redux

Russell Ito was correct to state that RagTime checks the network for multiple copies running with the same serial number ("Letters," September '90, page 18). But RagTime does this only on startup, printing, and about every ten minutes during normal operation. This means that additional network traffic is in the range of a tenth of a percent of the normal traffic on a LocalTalk network.

For large account customers, who find the necessity of installing a separate copy of RagTime at every workplace irritating, RagTime USA offers site-license agreements that allow the use of an unprotected copy of the software on the customer's network.

Thomas Everth, President
RagTime USA
Redwood City, CA

Graphic Words

I liked the *MacUser* "Guide to Graphics Formats" (September '90, page 266). It is a great help in the office when explaining graphics to IBMers.

Unfortunately, I can only give it a B+, not for what it includes but for what it doesn't. Speaking for myself, I have become a great fan of FullWrite Professional and it wasn't on the program compatibility list.

My use of FullWrite and its drawing program leads me to prefer it to other writing/drawing packages. When I import to FullWrite's drawing subprogram,

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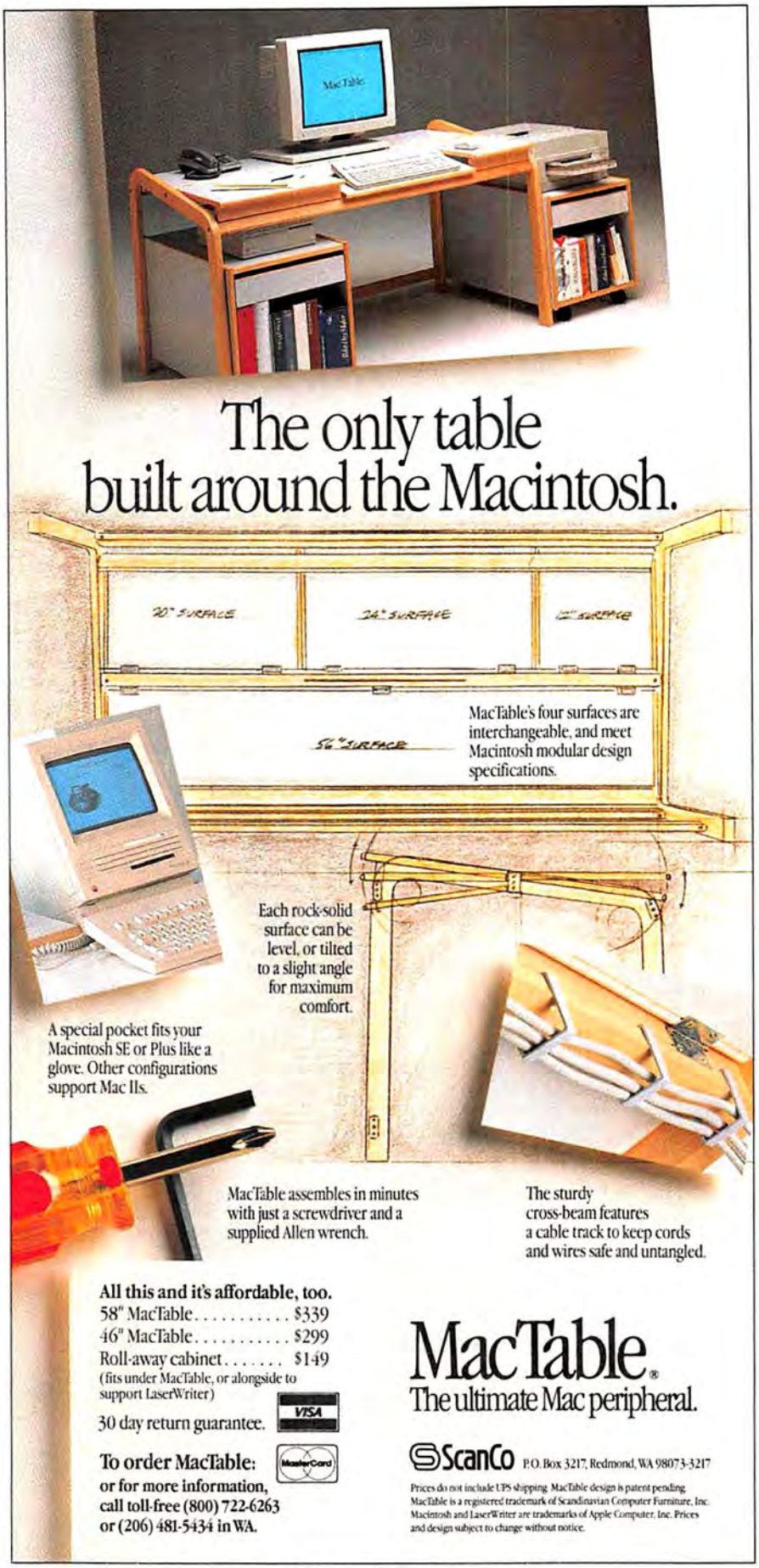

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it seems to do everything I need it to do — display, edit, and print. Perhaps it does not do everything on the graphics list, but without it being included, not too many people will know.

Bud Willner
Vienna, VA

Because of the issue's time and space constraints, we decided to limit the Graphics Format poster to graphics-specific programs. Programs that focus primarily on word processing, such as FullWrite Professional, were therefore not included. — AA

Puzzling Evidence?

As sysop of the Los Angeles Macintosh Group BBS, I was quite happy to read John Rizzo's article detailing some of the features available in Apple's new Communications Toolbox ("Communications Toolbox," September '90, page 295).

There is *one* thing I find just a wee bit alarming, though . . . . The icons for the communication tools in Figure 2 seem to be shaped like pieces from a jigsaw puzzle. Unfortunately, and I hope this isn't an omen of things to come, the pieces don't look like they'll fit together very well.

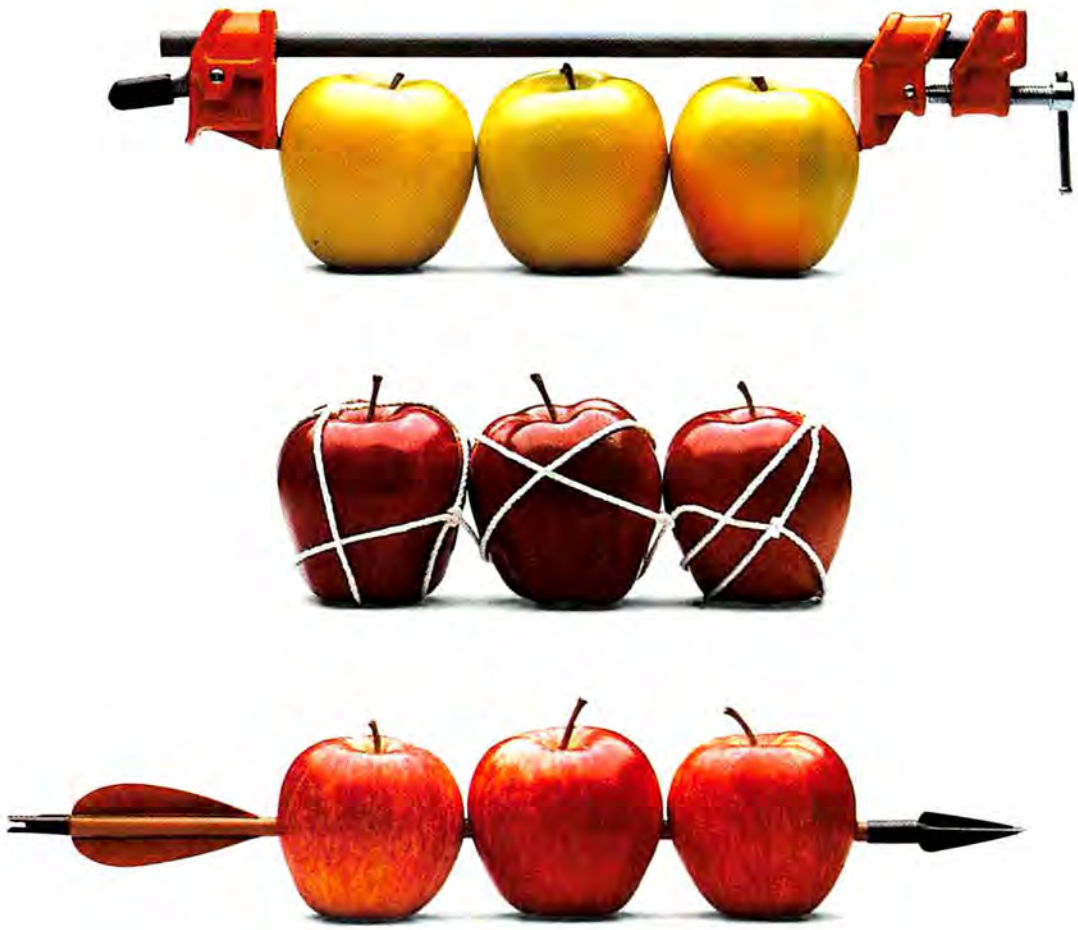
Reed Hutchinson
Los Angeles, CA

Clarifications

"An Inside Look at Scanners," (September '90, page 132) incorrectly identified Xerox Imaging Systems as formerly associated with DEST. It was formerly Datacopy and Kurzweil Computer Products, and its correct address is 185 Albany St., Cambridge, MA 02138; (800) 248-6550.

Force 12, the hurricane-tracking program mentioned in Help Folder (July '90, page 251) is not shareware but is available directly from the author for $17 or at a cost of $12 if both a disk and a self-addressed stamped mailer are included with the order. Jon Barry, 215 Reidland Road, Crosby, TX 77532.

"Mac CAD Takes Off" (August '90, page 114) stated that vPower from Vision Software was a VersaCAD add-on. Although vPower does work with VersaCAD as an API module, it can also import DXF files, which are a standard for many Macintosh CAD products.



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JON ZILBER

Fighting Words

There's a common thread from John Sculley's vision of the Macintosh to each user's interface with that vision: clear, concise words. Or, at least, there should be.

Jockeying between terminals at Boston's Logan Airport with a Mac Portable slung over one arm and a sheaf of manuscript revisions in the other, I was searching for a place to discard my now-worthless travel itinerary, thanks to a computer glitch on the part of the DOS-based airline industry. I spied a trash can with a label that proclaimed, in bold block letters: WASTE PAPER. Not a very good philosophy for an already environmentally beleaguered town like Boston, so I kept on moving.

Jet-lagged but thankful for the Portable's transcontinental battery life, I eventually arrived in San Francisco, now armed with 3,000 miles' worth of now-superfluous manuscript printouts to discard. This time the trash cans heralded a different message: Put Litter in its Place. Because litter, by definition, belongs just about anywhere *but* in a trash receptacle, this edict was no more appropriate than was its Beantown counterpart.

And that veritable coast-to-coast jargon of unearthly delights can no doubt be found on trash cans at all points in between. And on your desktop as well.

Form, says the saying, follows function, and the form of a trash can — whether in an airport or on a Mac screen — should make clear what its function is, even if function doesn't always follow labeling.

Ted Nelson (the Bart Simpson of personal computing) has pointed out that the meaning of the Mac's Trash icon can capriciously shift 180 degrees without warning. When you use the Trash to flush files into digital oblivion, the icon stands for destruction. But when you're using it to retain that data by ejecting a floppy disk, the Trash icon represents safekeeping.

Maybe — just maybe — the graphical user interface could be improved upon with some old-fashioned text-based instructions.

Form follows function, but in the realm of the Macintosh, we don't speak of form and function; we talk of look and feel. And in our quest for good looks and warm feelings, we sometimes forget the labels — and the words. Documentation, for example, often suffers from the bravado of developers and users alike — people who take immense pride in the belief that Mac products are so intuitive that we don't need no stinkin' manuals. Dialog boxes and icons use ornate, clever visual puns when a simple word or two would sometimes do just fine.

"Omit needless words" is another fine old maxim, but it has a vital corollary: "Include necessary words."

Words have enormous power — power to simplify or clarify as well as the power to confuse or obfuscate.

Which leads us to Apple.

Apple may not have coined the terms *desktop publishing*, *multimedia*, and *insanely great*, but it sure has franchised them, for better and — in some cases — for worse. In its search for a new angle to thrust the Mac into new applications and bigger markets, Apple needs some new words. Maybe even a new dictionary.

We don't need another Helocar. We don't need another desktop anything. And, much as I like that long-lived battery, we sure don't need another 17-pound behemoth labeled Portable.

What we need is words drawn from the existing vocabulary of the ensconced base of microcomputer users. And just what do those users actually do all day?

Memo to John Sculley: Look beyond Silicon Valley into the boardrooms and corridors of Corporate America. Apple's agenda needs to address the real needs of your customers.

And you, Mr. Sculley, aren't that different from your customers.

Apple's stated goals are twofold: higher performance and lower prices. Yes, Mac users want more-powerful CPUs, and of course, Apple needs more-competitive pricing to get its foot into more doors. But Apple needs something else — the vision thing. You, Mr. Sculley, need to identify the real problems of real customers and find and communicate creative and attractive solutions. It takes straight-talking words to get that crystal-clear vision across to computer users, would-be computer users, and users of other computers.

Nowhere is the lack of vision clearer than in the delays you're experiencing in shipping System 7.0. The testing delays stem from development delays, which in turn stem from the lack of a clear goal. Just what is it that Apple thinks users really want?

Ask not what John Sculley can do for the Mac; ask what the Mac can do for John Sculley. Your day-to-day operations aren't measured in MIPS, coprocessors, and planar/chunky bit planes.

No, Macintosh users want solutions to problems they already know they have — not more problems. If you have to initially sell

customers on the notion that they have a problem and then sell them the solution, you double your chances of losing the sale.

Apple can't afford to lose the sale.

Like the rest of us, you, Mr. Sculley, write memos. You attend meetings. You talk on the phone.

You don't "do" multimedia. You don't "do" workstation solutions. You don't "do" faster clock speeds, more slots, or virtual memory.

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Fortunately, the Macintosh already offers solutions to many of the bona fide problems of typical business computer users. The Mac "does" memos. It "does" meetings. It "does" phone. (It doesn't do Windows, but that's another story.)

New highs in performance and new lows in price aren't always enough. Higher levels of performance are worth paying for only if you're not satisfied with what you've got now. And lower price points can't compete with the ultimate in low price: sticking with whatever system you've already got. But give me a way to avoid writing memos, keep my meetings short, or silence the phone for a few hours, and I'll be a happy camper, ready and willing to contribute my fair share to support Apple's sky-high executive-compensation policies.

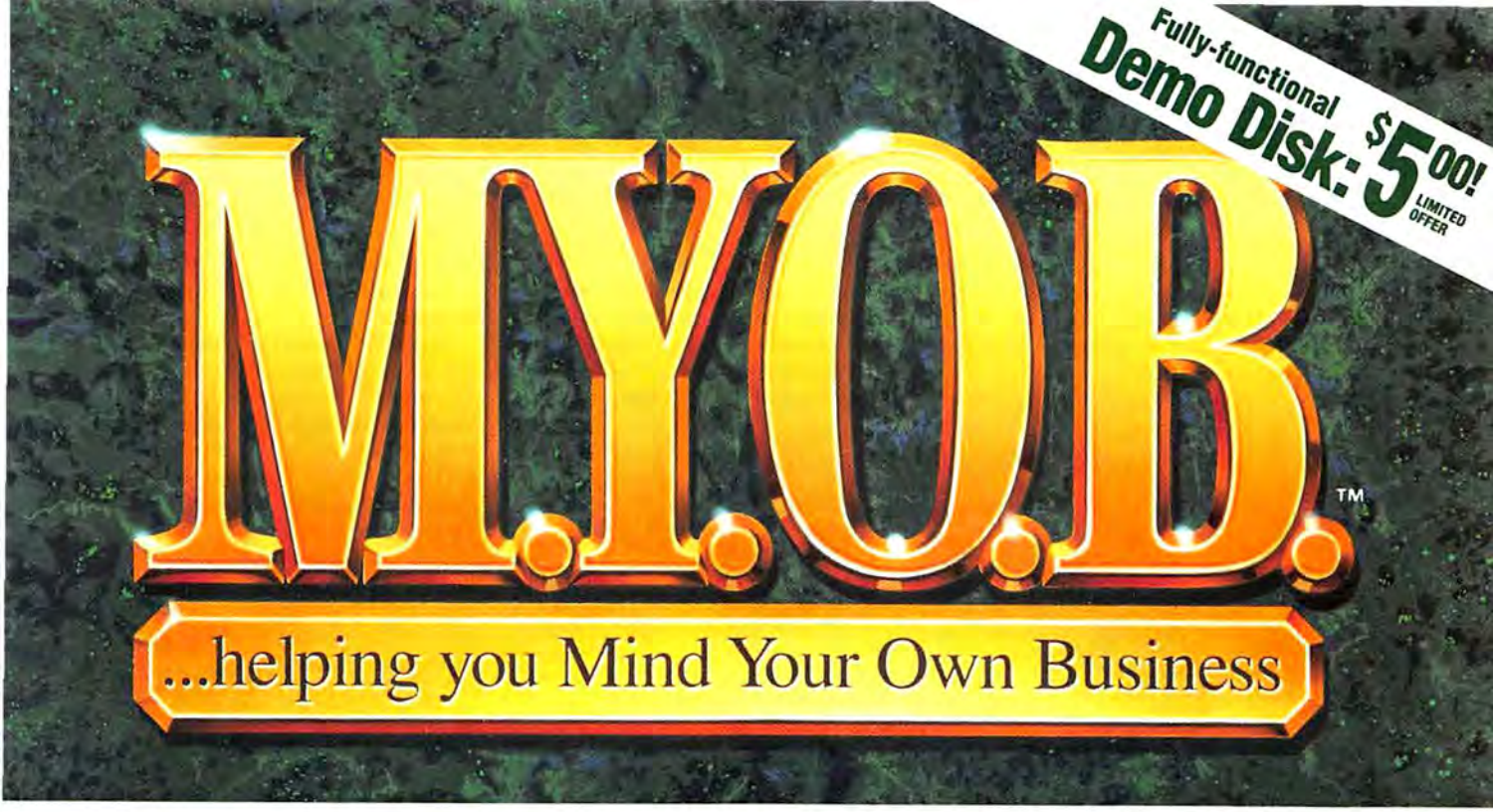
Words are a way to tell when a technology is becoming real — with real companies developing real products with real support for real customers at realistic prices that don't leave them reeling.

Just say the word. The right word. The meaningful word.

Say the Secret Word

Words are also a way to tell when a technology is becoming real — with real companies developing real products with real support for real customers at realistic prices that don't leave them reeling. When the language used to discuss it changes from the jargon of engineers (numbers and esoteric details) to the parlance of marketeers (buzzwords and meaningless neologisms), it's time to take a technology seriously. When 72-dpi output became "letter-quality" and 300-dpi multicolumn layouts became "desktop publishing," it was real. And when 600-megabyte magneto-optical storage devices become "personal archives," you'll know that the technology is kicking in, big time.

That time is now. Optical storage is shaping up as the Next Big Thing in business computing. This technology got



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its big break when Steve Jobs surprised the world by announcing that built-in optical storage was, in fact, the NeXT Big Thing and consumers on other platforms began clamoring for it.

An informal poll of *MacUser* readers revealed that optical storage tops the list of emerging technologies that need to be followed closely. And this month's MacUser Labs report on 20 optical drives offers some good news: It's really real. There are plenty of top-notch products at realistic prices ready and waiting to help you take the next giant step into the information age.

How significant is the coming shift to optical storage? Well, think of the changes that couldn't have happened without the 20-megabyte hard-disk drive (that's grown to, typically, a 40- or 60-megabyte unit). System software would be crippled without it. Most of the hottest application software couldn't exist. The casual attitude most of us have about keeping everything we might need right at our fingertips would turn into a nightmare of constantly trying to scrape up a few hundred K of available storage space.

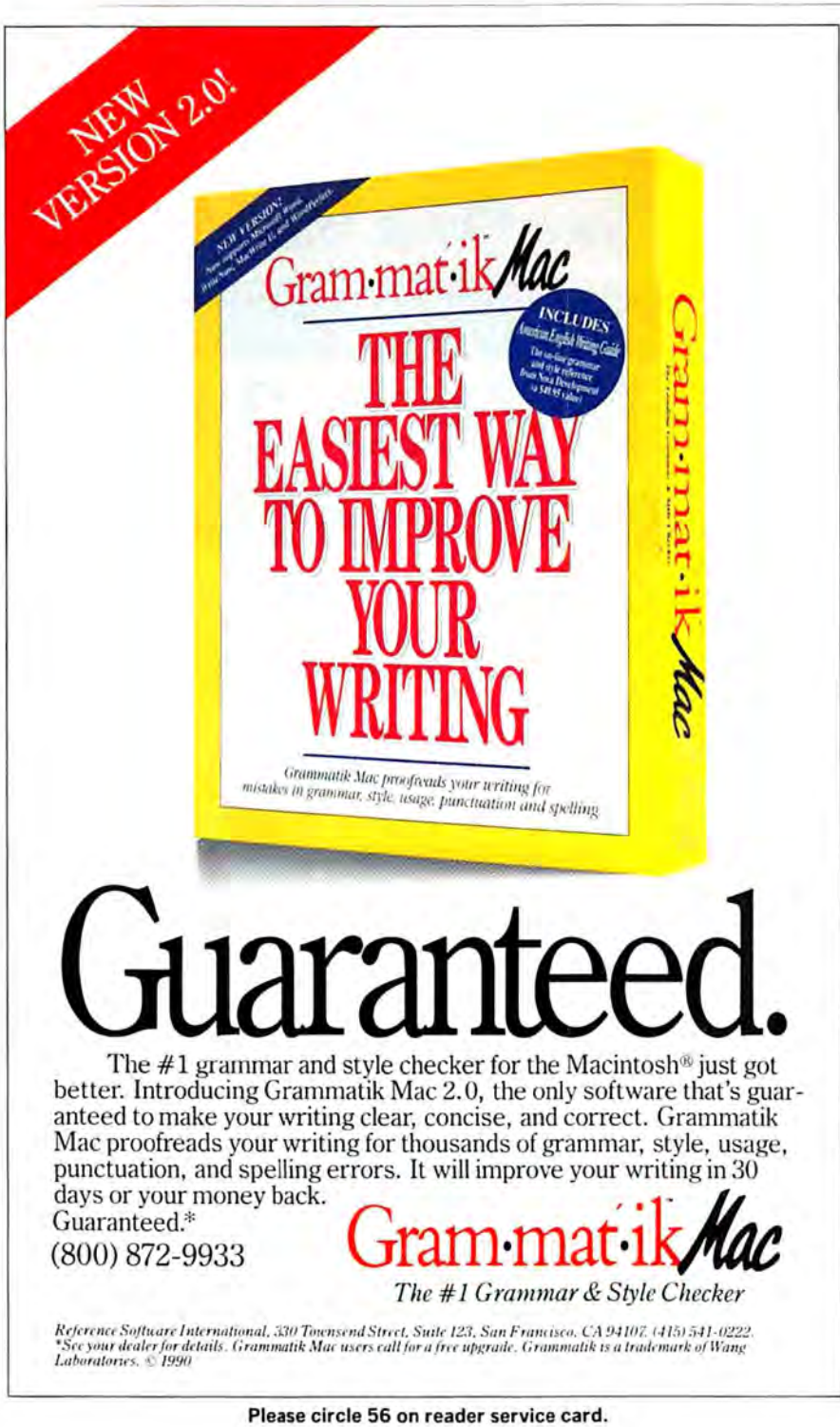
A few years from now, we'll be looking back at the preoptical days with the same incredulity: Remember when most users had only one partition running? Remember when A/UX was only for big nerd-ridden MIS departments and academic computing? Remember the days before true multitasking when you sometimes had to wait seconds — or even minutes — to regain control of your machine? Remember when applications didn't always contain full-blown multimedia-extravaganza Help files with animation, sound, and full-color graphics to make using the product a truly pain-free experience?

Seems like only yesterday.

And it's really only just tomorrow.

A Word from Our Sponsor

This issue of *MacUser* introduces a few minor changes in the magazine. You may have already noticed that we've tuned up our design a bit. And we've added a news-digest page at the start of our DTP and Bridges sections, which will keep you posted on all the latest news, products, and trends in the hot areas of desktop publishing and connectivity. You'll also find ways to get more from our articles by downloading supplementary electronic materials through our on-line service, Zmac, which is produced in conjunction with our sister publication, *MacWEEK*. In fact, if you'd like to exchange a few words, leave a message on "Fighting Words" in the Editors On Line section (section 7) in the *MacUser* forum on Zmac. (If you're a CompuServe subscriber, just go ZMAC at any ! prompt. If you're not, look for the Zmac ad in this issue for information on how to sign up.) Let me know what's on your mind and what you think of *MacUser* — for better or for words.



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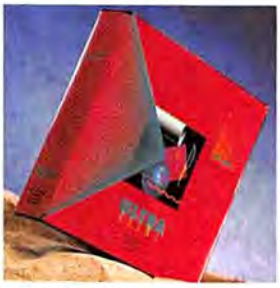

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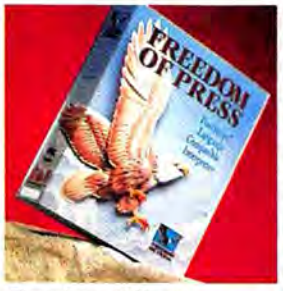

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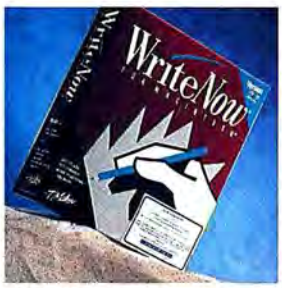

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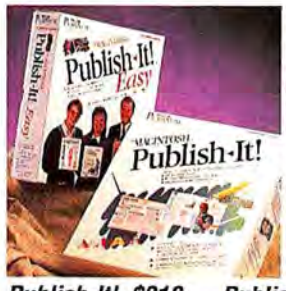

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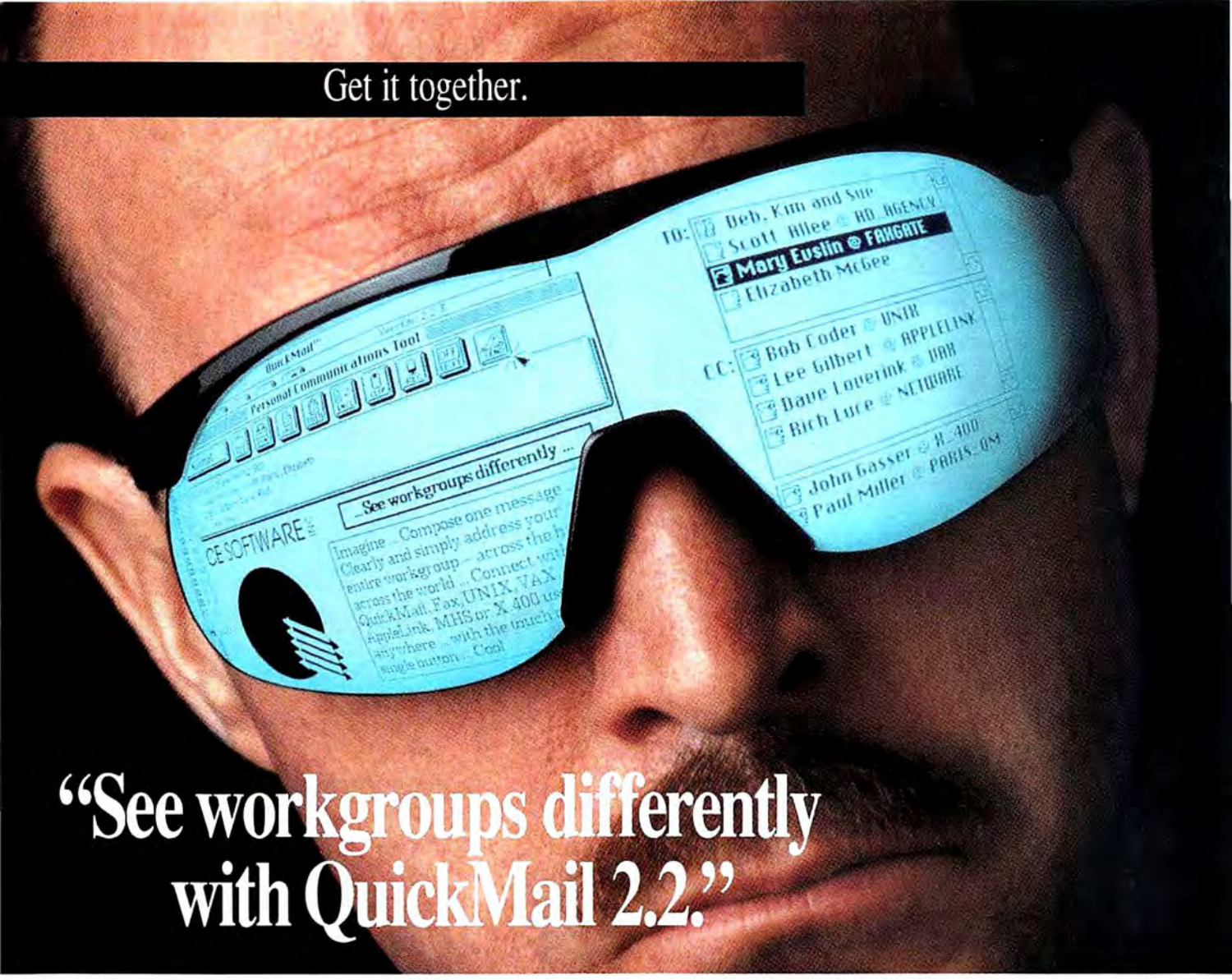

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Sixes and Sevens

When System 7.0 finally ships, will you be able to entrust your valuable business data to it right away? A look at Apple's track record for System software reveals the answer.

So much has been written about System 7.0 that you might think it is actually available. It's still not, of course, except to developers (and the early versions developers have been working with are not especially stable, so don't feel left out).

Those in the know are predicting that System 7.0 won't even ship in 1990. And when it does ship, it will lack some of the advanced features that were originally promised, which will have to wait until System 8.0 (or later) to make their debuts. This makes System 7.0 more than Apple's answer to IBM's (and Microsoft's) OS/2; it becomes almost a cousin in terms of long delays and reduction of features.

There's another similarity between System 7.0 and OS/2: When it finally arrives, many users may find that System 6.x is more their speed, just as many IBM PC users are staying with DOS.

Staying with System 6.x when System 7.0 ships actually has more to recommend it than you might think. Some users will actually have no choice. System 7.0 will require 2 megabytes of memory and at least the 128K ROMs, which makes a Mac Plus with upgraded memory the minimum requirement. (Apple essentially abandoned the 512KE and earlier machines with System 6.0, but System 7.0 will make it final.)

If you do have the requisite memory, it's probably no thanks to Apple anyway, because until recently most Apple systems, including high-end machines, were sold with only 1 megabyte. Interestingly, studies show that most of these systems have been upgraded with additional memory.

Some of the more advanced features of System 7.0, such as the much-ballyhooed true multitasking, will need a PMMU (Paged Memory Management Unit). This requires either a 68030 machine or an upgrade to add the PMMU to 68020 machines. In a corporate environment, you'll also have to weigh the pros and cons of running a mixed environment if all your machines can't be upgraded to support System 7.0.

But just because you can run System 7.0 is not sufficient reason to actually do so. Staying back one level is often prudent when new versions of operating systems come out. This policy has a long history of success and stability in the mainframe world. Let other installations experience any major problems that may lurk in untried software. When all the bugs have been shaken out, then move on up.

Mac owners saw the wisdom of this strategy when System 3.0 came out saddled with serious problems that could cause data loss. System 3.0 was followed by the ill-fated System 3.1, which in turn was superseded by the finally stable System 3.2.

Those who took their time about upgrading avoided the rocks of versions 3.0 and 3.1 and smoothly sailed into System 3.2. Even more recently, System 6.0 was quickly followed by multiple updates through System 6.0.5 (although some versions were designed to support new hardware, all versions included numerous bug fixes). After many pioneers had dutifully upgraded all the way to 6.0.5, Apple changed its usual recommendation that users stay absolutely current, to recommending 6.0.5 only for users of the IIfx, IIci, and Portable. The cognoscenti are already talking about System 7.01 and System 7.02, implying that the initial version will have a few too many bugs for most people's taste and that two (or more) updates may be necessary to make System 7.0 stable.

History is on the side of the pessimists when it comes to large, complex pieces of software, and System 7.0 is certainly one of the largest and most complex to come from Apple.

Even if System 7.0 ships without a single bug (and that's a mighty big *if*), you still may want to wait. Every major change to the Mac operating system has caused problems with some application programs, and a flurry of new versions is often released right after a new System comes out. Apple always says that it's the fault of third-party developers for not following Apple's rules, but the kind of major changes System 7.0 is brewing is making some of the rules change, so it's possible that even *good* programs may have serious growing pains under the new System.

You can bet that programs with a history of System friction are really going to get burned this time. System 7.0 will no longer distinguish between Finder and MultiFinder environments, so programs known to have problems under MultiFinder are likely to have worse problems with System 7.0.

Many of those indispensable little INITs and cdevs, already often the source of problems and conflicts, are almost certain to need revision. Some may not even be able to make the transition to the new System, because so

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System 7.0 is one case where the Mac user's penchant for the latest and greatest could be an even greater detriment to stability than it usually is.

much is changing. (Some of the functions of these small utilities are being folded into System 7.0, which slightly reduces the chances for conflicts.)

The long delay in the official shipping of System 7.0 gives developers extra time to get their programs working with the prerelease versions that Apple has provided. This reduces the potential for major problems, but there's no guarantee that every developer's software will be ready with System 7.0 versions in time.

So unless you want to find yourself at sixes and sevens with your Mac, you should examine your priorities before rushing ahead to System 7.0. Use the extra time provided by the delay to make sure you're ready — whichever way you decide to go.

If all your machines are ready for System 7.0 (enough memory and Mac Plus ROMs or better) or can be made ready in time, you're a risk taker, and you just can't stand the thought of someone else having System 7.0 when you don't, then by all means go ahead and be first in line to upgrade.

If you need the capabilities of System 7.0 for a special application (some that will require advanced features such as interapplication communication are rumored to be in development), then you have no choice but to upgrade.

However, if stability means more to you than being the first on your block with a new toy, you might just wait a few months to see how it goes for the pioneers. I'm not saying that System 7.0 doesn't have a lot to recommend it. But if you depend on your Mac to run your business, then moving forward slowly and smoothly is much better than making a precipitous leap that exposes you and your valuable data to possible danger. This is one case where the Mac user's penchant for the latest and greatest could be an even greater detriment to stability than it usually is.

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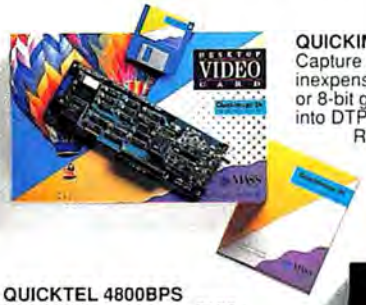

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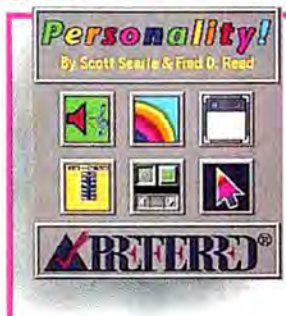

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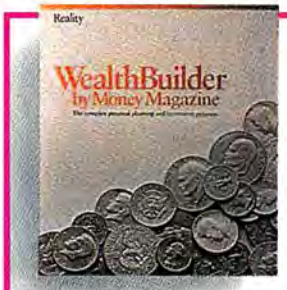

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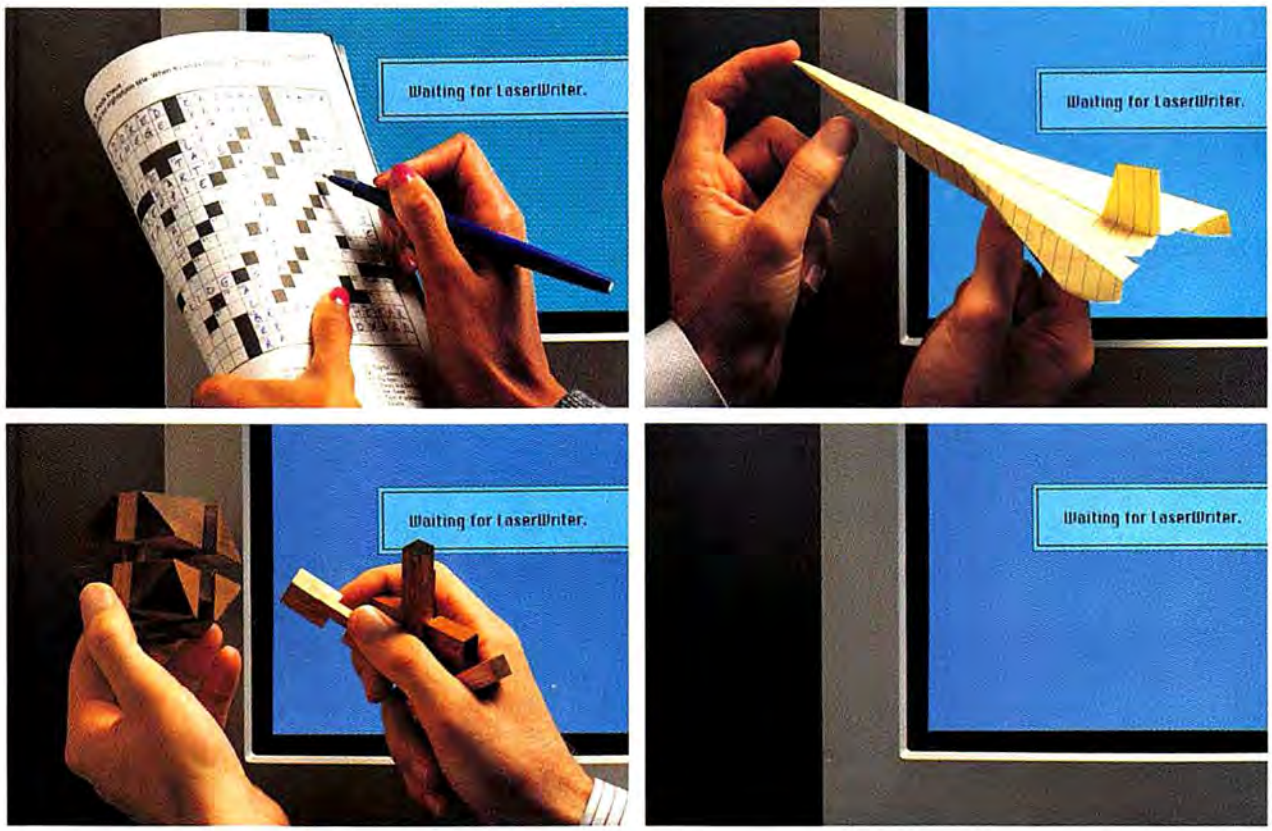
Idle Macs Are The Devil's Playground.



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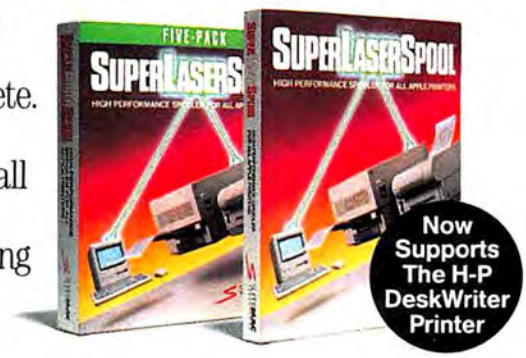

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Squeezing the Chairman

If Guy were elected to Apple Computer's board of directors, what would it be like? Hint: Remember what Ross Perot did when he was on General Motors' board?

It surprises many people that I take so many potshots at Apple Computer in my column. They misunderstand me. I love Apple, but that doesn't prevent me from criticizing it. I'd like to do all I can to help Apple succeed. This month I'm proposing a really radical idea (I've never been known to lack chutzpah): Elect me to Apple's board of directors.

I'll represent the thousands of shareholders and stakeholders who cherish the Apple Dream of improving people's creativity and productivity. There may not be enough Apple *shareholders* to elect me to the board, but there are certainly enough Apple *stakeholders* to do it. (A shareholder owns stock. A stakeholder believes in a company's dream.) I think I can do a lot of good, and it would be a blast. This column is my campaign pitch.

The Current Board

The Apple board of directors is presently made up of Peter Crisp, Albert Eisenstat, Mike Markkula, Arthur Rock, John Rollwagen, and John Sculley — as nice, famous, smart, and rich a bunch of guys as you could possibly find. There's only one thing wrong with them: Generally, they really don't use and love computers. Not the way most of us do, anyway.

The problem is that the current board members are too rich and successful. Thus, they have at least one dedicated secretary or administrative aide to do much of their computing. (This is the equivalent of Porsche's board members being chauffeured in a limo.) I suspect that they don't even add paper to their LaserWriters. This assumes, of course, that they haven't already given their Macintoshes to their kids. Don't believe me? Try this test: Send them an AppleLink, and see how long it takes for them to read it and if they respond personally.

The Impact

The impact of not using and loving computers is enormous. First, the directors are easy to fool. I should know — I used to do it. Jean-Louis would prep us on what they wanted to hear, how to gloss over details, and how to get out of trouble. Think about it: What kind of board of directors would approve a 16-pound portable? And then wait for more than a year for a replacement that is barely lighter?

Second, they worry too much about what the financial analysts and pundits are saying. (Mind you, these are the same analysts and pundits who recommended that Apple build an MS-DOS clone in 1983.) Because they listen to these analysts and pundits, they direct Apple employees to do dumb things instead of the right things. How else, for example, could you explain Apple's deep desire to have MS-DOS cards available for Macintosh?

Third, the directors are out of touch with what computing means for the rest of us. Frankly, no one with a net worth of more than $10 million could possibly know what it's like for the rest of us to own and operate a computer.

I mean this in two ways. First, in the sense of sensitivity to the cost of the Macintosh computer experience. Second, in terms of the excitement of seeing cool little products such as Kiwi Envelopes that may not change quarterly earnings but that make the world a slightly better place to live.

My Qualifications

I think I'm qualified. I hope I can convince you too. OK, so I haven't gone into space as Sally Ride has, but I have ridden some shuttles such as the World Trade Center-Bayside and Mosone-Haynes. I also fly coach class with a Portable all the time (I have deformed elbows and slanted eyes to prove it). And speaking of slanted eyes, I represent an oppressed minority — the Japanese-American.

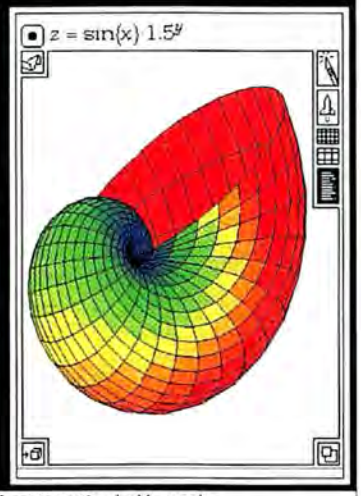
Let me tell you what else I could bring to the current board.

First, I use a Macintosh about four hours a day. Although I'm not technical, very few five-minute, skin-deep, whiz-bang engineering demos fool me. And if I think I'm being deceived, I can ask Andy Hertzfeld what he thinks — not the analysts and pundits (although I might make an exception for Stewart Alsop).

Second, I understand what it's like to be an Apple developer. (Apple developer, *n:* synonym for oxymoron; organization that Claris creates tools for.) I evangelized them, and I was one of them. No one on the current board has a good idea what it's like to be an ant in the jungle when the elephant starts to rock and roll.

Third, I was a rank-and-file Apple employee. While all the honchos are moving employees around the board with the reorg du jour, I know what it's like to be a pawn. I also know what it's like to work at Apple without

Intuitive Tools For Mathematics



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What kind of board of directors would approve a 16-pound portable? And then wait for more than a year for a replacement that is barely lighter?

golden parachutes, golden handcuffs, or golden prophylactics.

Fourth, I am a member of the press. (I am certain of this, because I get a press badge for Macworld Expos without asking.) I know the gruesome details of how the Apple Computer/Regis McKenna PR machine tends to bend, shade, and purify the truth. I also know that everyone knows what it really means when Jean-Louis decides to pursue even better interests.

My Pledge

Read my lips. If elected, this is my pledge: I will represent the computing needs of the rest of us who don't have secretaries, who ride in coach class, and who still care what things cost; I will try to increase EPS (evangelism per share) in addition to earnings per share; and if it's the last thing I do, I will make sure you can call Apple and reach tech support (the phrase "Go back to your dealer" will be banned forever). If it's the second-to-the-last thing I do, I will ensure that the amount of money we spend making videos is less than the amount we spend on tech support.

It Will Never Happen

One sure thing about my idea is that it will never happen. I would be the last person that Apple would want on its board, because I'd make too much trouble — just as General Motors' board couldn't stand having Ross Perot as a director and finally bought him out. (Actually, I consider not being wanted on Apple's board quite flattering.) On the other hand, anyone else who could represent these points of view and evangelize these objectives could do Apple a world of good. It doesn't have to be me.

Want to get in touch with Guy? Do it directly: America Online — MacWay; AppleLink — Kawasaki2; CompuServe — 76703,3031; Fax — 415-326-2398. Or, the old analog way, he can be reached at 488 Cowper St., Palo Alto, CA 94301.

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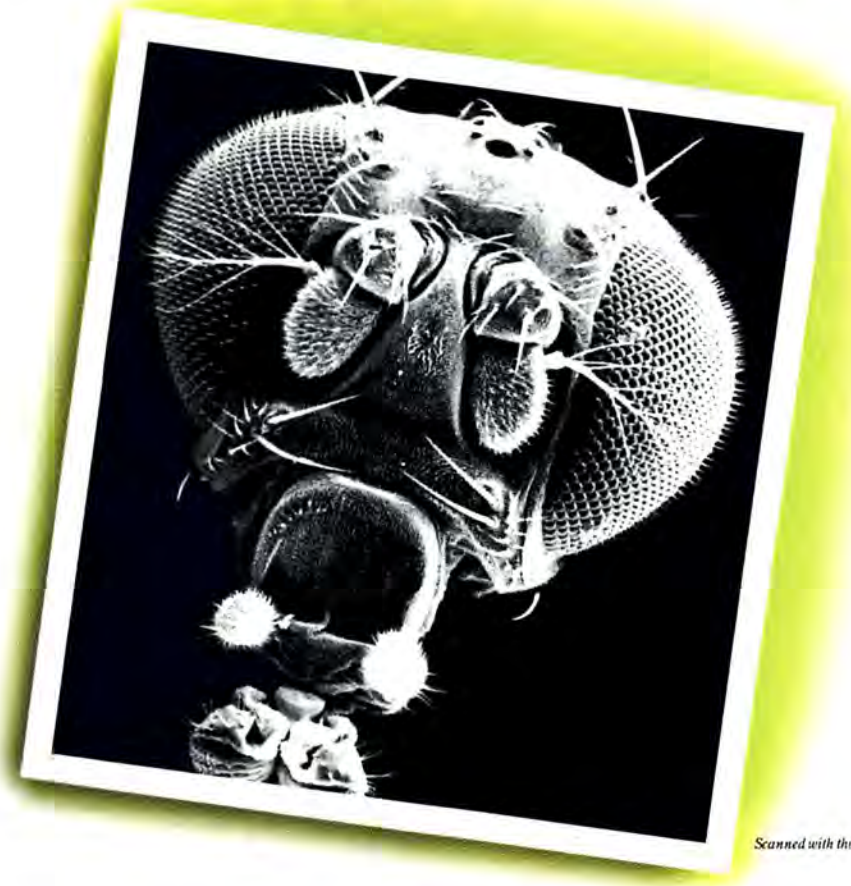

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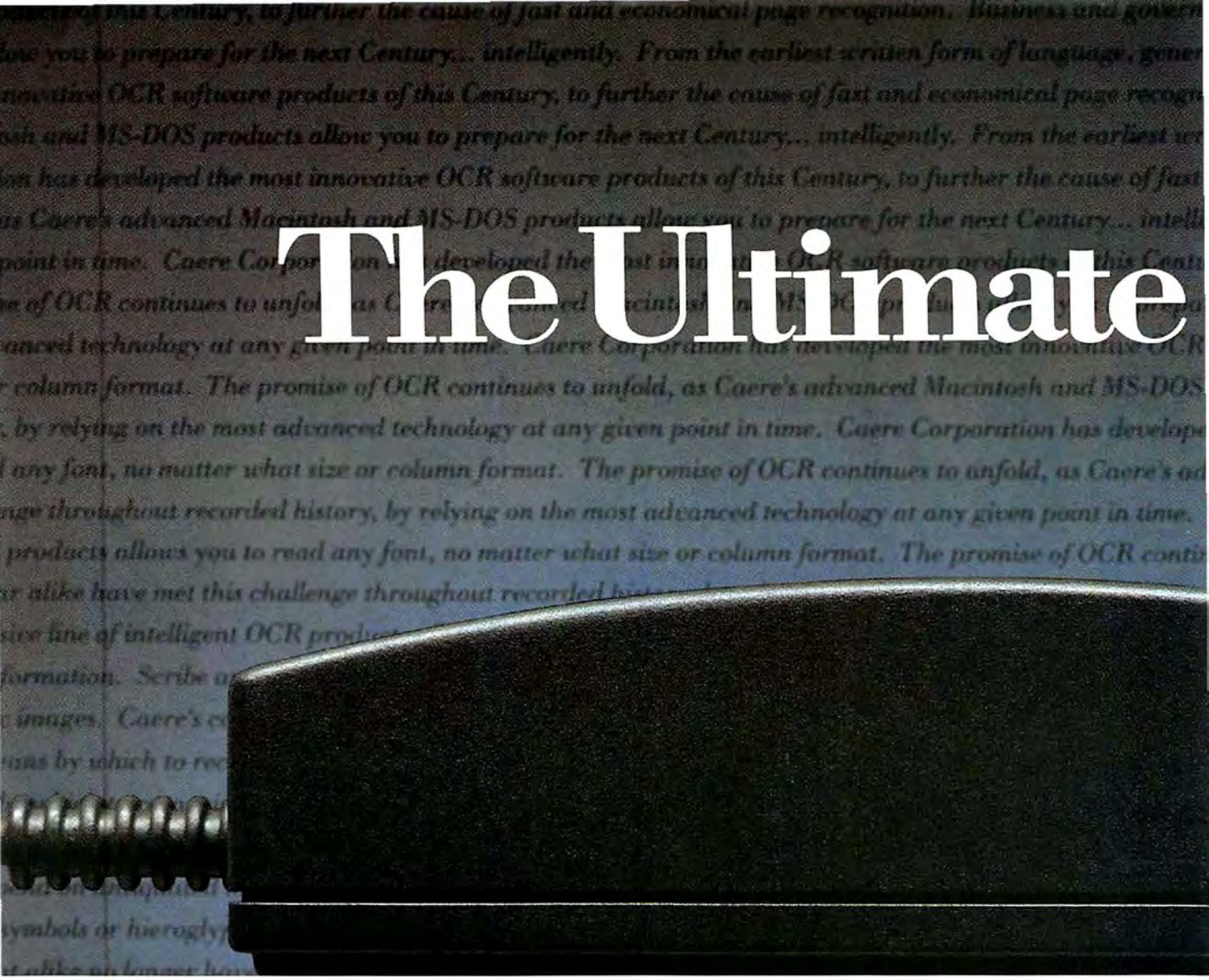

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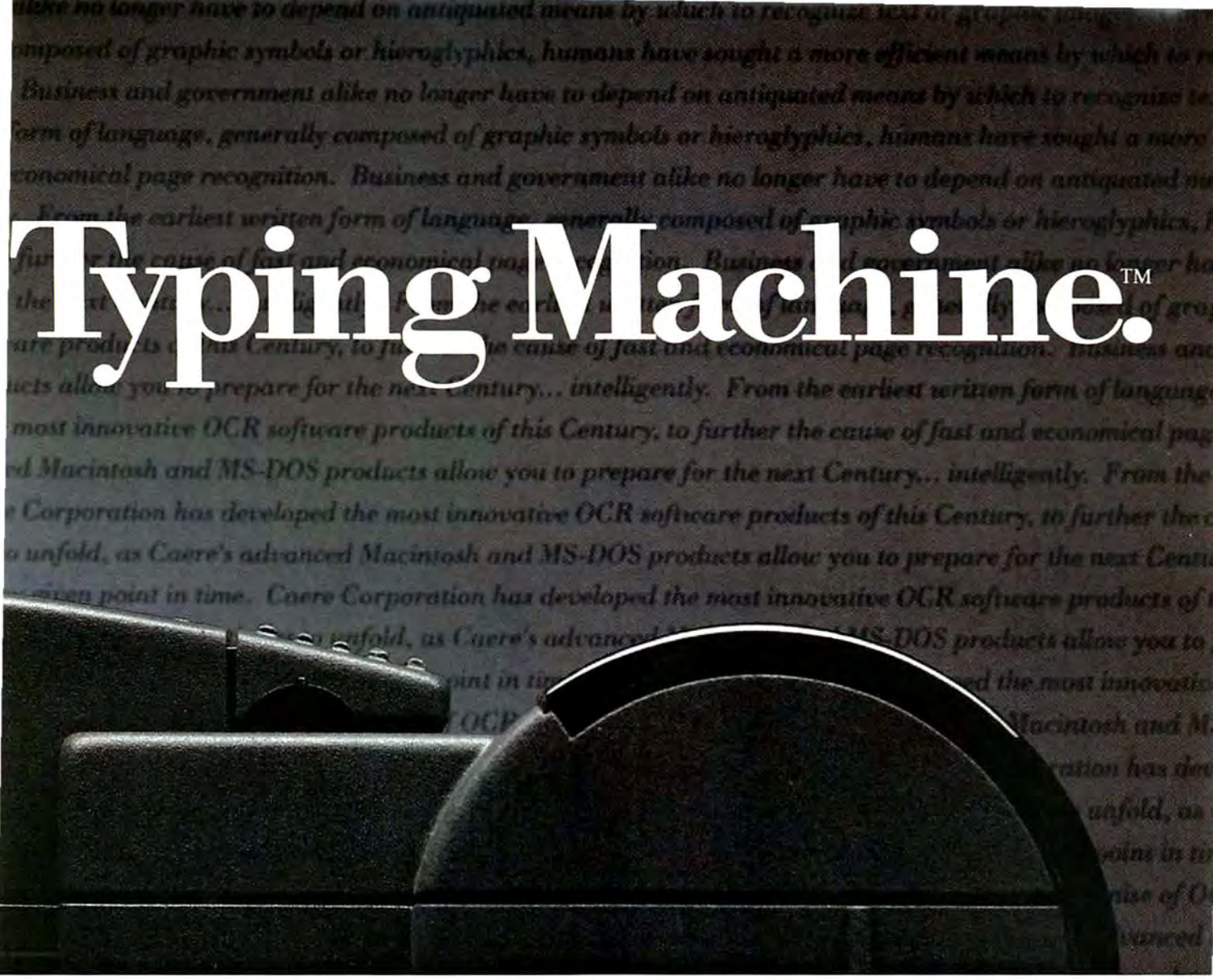

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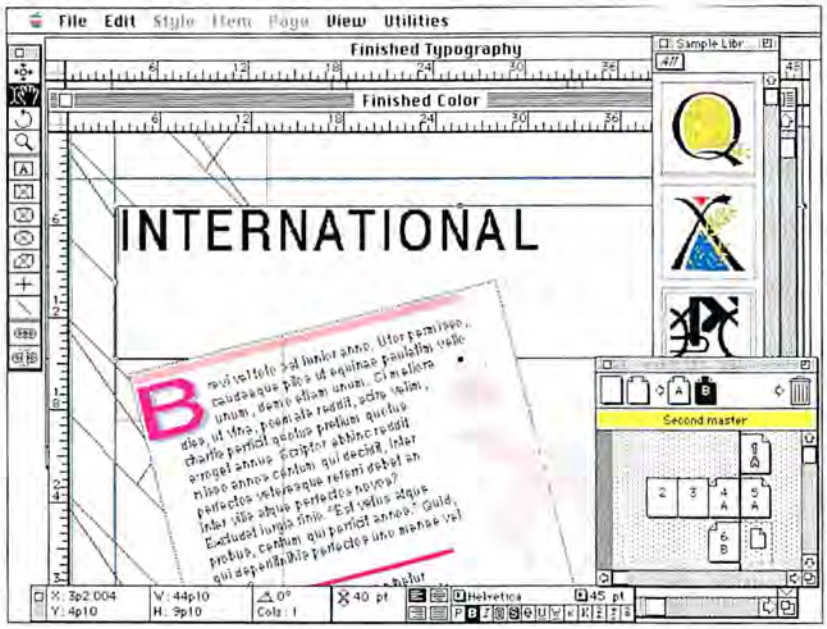
PAGE LAYOUT

QuarkXPress 3.0

In its third version, QuarkXPress moves to the top of the heap in page layout.



QuarkXPress 3.0 is packed with new features. Clockwise from the upper right corner are a library window, the document-layout palette (notice that the document contains a four-page-foldout spread and that a new page, based on the highlighted master page B, is being created next to page 6), the measurements palette, and the tools palette.

With its third incarnation, QuarkXPress has finally left behind its once-justified reputation as a powerful-but-daunting desktop-publishing program that made you play by its own rules — or else. In completely rewriting the program, Quark has done more than just incorporating some of the enhancements users have been clamoring for and smoothing some of the more notorious rough spots. Version 3.0 bristles with wonderful new features, and the interface has been brilliantly redesigned.

You Asked for It. First, here's a look at how some of the major complaints about earlier versions have been addressed. QuarkXPress' default pages were always a poor substitute for real master pages. Now you can have as many as 127 different retroactive master pages per document. You can easily change the master page that applies to a particular page simply by dragging icons inside the new document-layout palette, which gives an iconic view of every page and master page in a document. When you change a master page, all the changes are reflected in every page based on that master. If you apply a new master page, the document pages instantly change to reflect the new master.

The edge of each page is no longer the impenetrable boundary it once was. You can drag objects completely off a page and use the space outside the page as a pasteboard much like PageMaker's. You can also drag objects partially off pages to create bleeds, another former near-impossibility. You can even create objects that stretch across multipage spreads.

You're no longer confined to using cumbersome parent/child boxes when you want to associate objects permanently. You can now select and permanently group multiple objects with the standard Shift-click command or by using the marquee tool. Although the parent/child-box arrangement is still available, users can opt to use the more flexible — and less confusing — option of permanently grouping objects as necessary.

QuarkXPress now lets you rotate any object or group (either text or graphic) in increments as fine as .001 degree, either by using the mouse with a new rotation tool or by typing the exact amount of rotation you want.

Improved Interface. QuarkXPress 3.0's thoroughly revamped interface makes it a joy to use. The tool palette is no longer attached to the left side of every window but now floats above the page. There are three new tools — for rotating objects, creating irregularly shaped picture boxes, and zooming the page image with a magnifying glass. In a welcome touch, you can drag the magnifying glass over a displayed page to exactly select the area to be shown when the page is zoomed. Double-clicking on most tools lets you customize their defaults.

At the heart of QuarkXPress' new look is the floating measurements palette. It displays information about any selected object, such as *x,y* coordinates, overall measurements, the amount of rotation, the fonts used, and so on. These numbers aren't a static display. You can click in any box and type in new information, and the selected object instantly changes accordingly. This is a great way to modify objects quickly, because you can use the palette to simultaneously modify all the objects in a multiple selection.

Quark has made things even quicker with some clever shortcuts. There's a pop-up font menu when text is selected, for example, but you don't have to scroll to find and change fonts. You can simply begin typing the name of the new font into the field next to the menu. As soon as you've typed enough characters to identify a font, the entire font name appears.

Page Management. You can have as many as seven files open simultaneously, and if you want to move objects from one document to another, you simply select and drag whatever objects you want from one document window to another. In the Thumbnails mode, you can drag entire pages between documents.

You can also drag objects into a library palette. Library files are collections of objects — including entire pages or master pages — displayed in reduced view. You can save any object in a library and then retrieve it by simply dragging a copy

of it from the library onto a new page.

In addition to managing master pages, the document-layout palette lets you rearrange pages by copying, pasting, and deleting them or by dragging their icons. You can easily create multipage spreads by dragging the page icons into the spread; you can then display and work on the entire spread as if it were one page.

Not only can you make multiple selections and create groups, but there's also a Space/Align command that lets you align or distribute multiple objects. This makes it a snap to create tables from multiple text boxes, for example, while making certain that all the rows and columns align properly.

The Winning Type. Although version 3.0 still doesn't have all the features professional typographers might want (such as hanging punctuation or adjustable underscores), QuarkXPress maintains its undisputed lead as the best DTP program for handling type. The program now lets you define the proportions and offsets of superscripts, subscripts, small capitals, and superior type. There are several new paragraph options: You can create anchored rules above or below any paragraph, as well as create automatic drop caps and have some amount of widow and orphan control. You can also anchor any object — text, graphic, or group — to text, simply by pasting the object into a text column.

QuarkXPress now also supports vertical text alignment within any text box: Text can be centered, justified, or aligned to the top or bottom within a box. You can also specify the exact amount of space between the top of a text box and the baseline of the first line of text.

As with type, QuarkXPress 3.0's handling of words has been beefed up. The fast spelling checker and the powerful global search-and-replace (it finds and changes text attributes as well as strings of text) can now examine all the text in a document in a single pass. There are also three new special characters: an "indent here" character, which lets you quickly indent a paragraph to the character's location; a discretionary-new-line character, which lets a word break at the end of a line without inserting a hyphen; and a nonbreaking em dash.

Style Problem. QuarkXPress' handling of style sheets hasn't benefited from 3.0's jazzy interface changes. As in previous versions, the sheets sometimes behave erratically. When you change a style, for example, the text formatting doesn't always automatically change to reflect the new style sheet, which forces you to go to the new style via No Style on the Style Sheet command. This procedure makes you lose any local formatting exceptions you may have applied to the text in a paragraph. Someday the excitement of QuarkXPress' style sheets should come from their power and speed, not their unpredictability.

Pictures Perfect. Although QuarkXPress still can't separate color TIFF images, there are several handy enhancements to the program's picture handling. You can now create polygonal graphic boxes of any shape by adding and moving points. You can create manual text runarounds for pictures. One neat trick, for example, is to create an inverted runaround that forces the text behind the picture box to flow *inside* the runaround you've drawn, making it easy to create star bursts and other text effects.

QuarkXPress was the first desktop-publishing program to do true process-color separations. It continues its lead in color-handling by letting you specify custom color choking and spreading information for each color in a document.

The Bottom Line. Aside from indexing and creating tables of contents, there is very little that PageMaker 4.0 can do that QuarkXPress 3.0 can't, and QuarkXPress far outpaces its rival in most other areas. This release also contains excellent documentation that is a great help in getting the most from this rich program.

Like many other high-ticket programs, QuarkXPress 3.0 checks networks for multiple copies of the same serial number. Version 3.0 won't launch if it detects a copy with the same number already active on a network.

QuarkXPress 3.0 is by far the finest Mac desktop-publishing program available. It sets a new standard in DTP.

— Eric Taub

Get Info

QuarkXPress 3.0

★★★★½

Published by: Quark, 300 S. Jackson St., Suite 100, Denver, CO 80209; (800) 356-9363 or (303) 934-2211.
Version: 3.0.
List Price: $795.

NewsLine

Reports and Analysis

Apple Takes a Bite of Outbound

CUPERTINO, CA — Apple Computer has reached an agreement with Outbound Systems of Boulder, Colorado that will let Outbound continue selling its light portable computer without infringing on Apple's intellectual-property rights. Although Apple has not licensed any technology to Outbound, Outbound will sell some of its technology to Apple. The Outbound technology may help Apple produce a light portable machine next year. Some reports speculate that such a unit may appear as soon as March 1991.

Jasmine Redux

SAN FRANCISCO, CA — Jasmine Technologies has emerged from Chapter 11 bankruptcy, following its purchase and reorganization by Chess SA, a Paris-based holding company. Consumers, however, shouldn't rush to their mailboxes in anticipation of a quick refund for undelivered merchandise. Unfilled consumer orders will be reimbursed over a five-year period. However, Microtech International will continue to honor Jasmine warranties, and it will also service Jasmine drives that are out of the warranty period, for a fee.

SuperMac Ships Spoolers South

SUNNYVALE, CA — SuperMac Technologies has sold its three print spoolers — SuperSpool, SuperLaserSpool, and Multi-User SuperLaserSpool — to Fifth Generation Systems of Baton Rouge, Louisiana. The sale had been expected, as SuperMac's revamped product line, including large monitors, high-capacity storage devices, and PixelPaint Professional, has increasingly emphasized the graphics market. SuperMac still retains a few utilities (DiskFit, Network DiskFit, and Sentinel), but observers expect that the company will also sell those products soon and focus entirely on the graphics market.

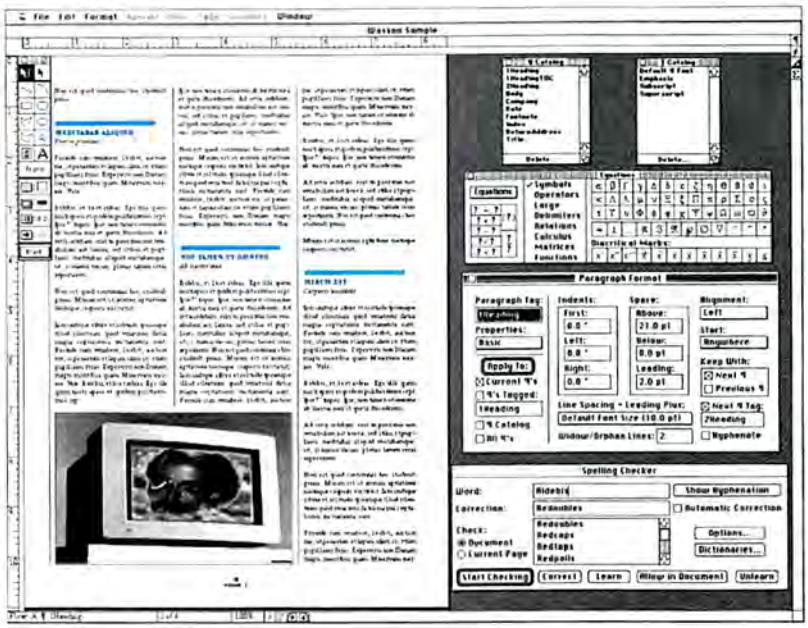
Truvel Enters Chapter 11

CHATSWORTH, CA — Truvel, maker of the TruScan line of scanners, has filed for Chapter 11 bankruptcy protection. Vidar Systems of Herndon, Virginia, a manufacturer of large-format scanners primarily used in engineering applications has assumed management of Truvel and is expected to acquire the company, pending court approval.

PAGE LAYOUT

FrameMaker

Long-document publishing power finally comes to the Mac in a powerhouse program.



FrameMaker, the first successful page-layout program designed for creating long technical documents, is a happy marriage of functionality and adherence to the Mac interface. With all its available controls, FrameMaker is best used with a large-screen display.

Although desktop publishing has revolutionized the way we generate newsletters, brochures, and corporate reports, the software used by the DTP industry presents some problems when it comes to long documents such as books or technical manuals.

Interleaf made a sporting, but abortive, attempt at porting its workstation program, Interleaf Publisher, to the Macintosh two years ago (see "A New Leaf on Life," May '88, page 158). The program's interface and outrageous font mismanagement, however, doomed it from the start.

Frame Technology apparently learned from Interleaf's bitter experience and did almost everything right when it ported FrameMaker, also a workstation program, to the Macintosh. For the production of long or technical documentation, it has no equal in the Mac arena.

Frame Building. Installing FrameMaker involves simply dragging files from the eight distribution disks to a hard-disk drive. Unfortunately, Frame Technology didn't set the application's bundle bit on any copies of the master disks I've seen. That means, contrary to what the manual says, that you cannot simply double-click on a FrameMaker document from the Finder and expect it to open. You have to use a program such as ResEdit, DiskTop, or Norton Utilities to set the bundle bit. It's hard to believe that this wasn't caught before the product shipped, but Frame said the problem had been fixed as we went to press.

For optimal use, the $995 program needs an SE/30 or Mac II equipped with a 40-megabyte hard-disk drive, 4 megabytes of RAM, a PostScript printer, a large-screen monitor (preferably a two-page display), and System 6.0.2 or later. It can function as a hard-core word processor (albeit an expensive one) on a Mac Plus with 2 megabytes of RAM and a hard-disk drive. The program fully supports ATM and MultiFinder.

FrameMaker, likeQuarkXPress, DesignStudio, and many others, uses text or graphic frames as its basic building blocks. (There is no pasteboard, however, making FrameMaker less than ideal for design-intensive projects such as newsletters.) Creating a new document involves steps that are familiar to users of major DTP applications. You establish the number of pages (limited only by disk size), create up to 25 master pages, and create paragraph and character formats. Landscape and portrait pages can be mixed within the same document (useful for foldouts). You can also construct reference pages for storing frequently used graphics or text blocks so that material such as logos, rules, or boilerplate text is placed only once in a document. FrameMaker also supports registration and crop marks during printing and can output spot-color separations. From this point on, however, FrameMaker begins to distinguish itself from other DTP programs with some sophisticated, powerful features — many of them unique in the Mac world.

Characters with Style. FrameMaker provides extensive power for creating paragraph formats (usually called styles in other programs). The Paragraph Format dialog box contains controls over tabs; fonts (a built-in font harmonizer similar to Adobe Type Reunion makes selecting weights and styles a pleasure); pair kerning; auto-numbering; the option of forcing one style to always follow another style; widows and orphans; hyphenation; the option of exempting a paragraph from spell-checking (this feature lets you specify that a block of programming code, for example, should not be spell-checked); and the automatic placement of bullets, graphics from reference pages, and anchored rules. This dialog box, like most dialog boxes in FrameMaker, is not modal. In other words, it can remain open while you are working in the document. FrameMaker also supports character-level formats that can be saved in style catalogs in much the same fashion as paragraph formats. Both the paragraph and character catalogs are easily accessible from floating palettes.

The program's 130,000-word spelling checker (augmentable with document/template-specific or user dictionaries) works well and quickly. It can automatically delete extra spaces and search for unusual capitalization or hyphenation. You can instruct it to ignore words in all

caps, words with digits, or words containing specific symbols or characters.

The program can also prevent you from typing two spaces at the end of a sentence. You can apply smart quotes and indicate where FrameMaker can break lines without hyphenating a text string (a wonderful feature for documents that include things such as DOS pathnames). FrameMaker also has powerful GREP-like find/change capabilities and can search for paragraph and character formats, special characters and markers, cross-references, frames, and so on.

FrameMaker supports PostScript pass-throughs, much as Word 4.0 does, so you can include PostScript routines for generating special text effects.

FrameMaker includes text-import filters only for MacWrite 5.0 (not MacWrite II), Word 3.0 or 4.0, and ASCII, but the program's extensive text-editing features might well make composing in an external word processor unnecessary.

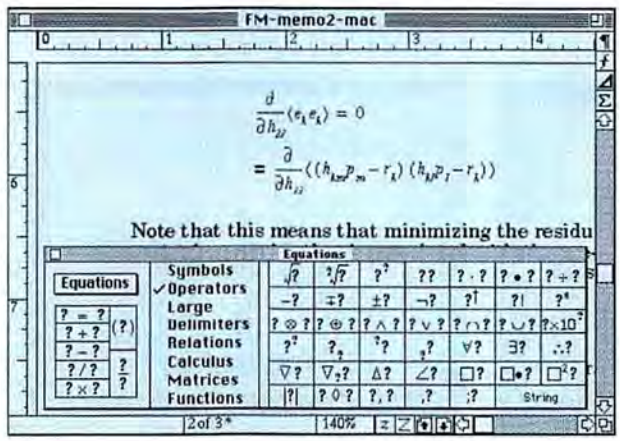
The major shortcoming in the text department is the absence of a table editor. The package contains a booklet that shows how to create tables — clumsily — in FrameMaker, but it primarily draws attention to this significant failing.

Advanced Framework. Features such as cross-referencing, automatic TOC (table of contents) generation and indexing, variables (equivalent to glossary items in other programs), book building (linking separate documents into one with full support for cross-references, footnotes, TOCs, and indexes across all parts of the "book"), and change bars make appearances in other programs, but FrameMaker's implementation surpasses the competition. And Frame has packed some other suprisingly powerful features into FrameMaker — such as MIF (Maker Interchange Format), MML (Maker Markup Language), hypertext, and FrameMath.

MIF is a format that saves FrameMaker documents for use on other platforms running FrameMaker (see the "Frame to Frame" sidebar for details on networking FrameMaker on different platforms). You can also use MIF to create custom import or output filters.

MML is a markup language that lets you use any standard text editor to provide basic format information on items such as page size, paragraph-format names, anchored frames, and the like. Text files tagged in this way can be opened as formatted documents from within a FrameMaker template.

FrameMaker features strong cross-referencing power, including the insertion of variables for page numbers and source-file names.



FrameMaker's math palette offers an intuitive point-and-click interface for typesetting, and it can even solve complex equations.

FrameMaker's hypertext feature makes it possible to attach hypertext files to documents. A publishing work group, for example, can create a hypertext explanation of the in-house style, standardized abbreviations, or instructions on how to use a specific template and make this explanation accessible from a particular document. You can create buttons and pop-up menus to aid in navigation via a HyperTalk-like programming language.

But the jewel in the crown is FrameMath, an integrated module that lets you typeset complex display or in-line mathematical equations by using a clever floating palette without resorting to tedious code entry (as in Word). And the program not only sets the equations you key in but can solve them as well. If you've forgotten how to add fractions, FrameMaker can do it for you. Equations, once set, remain fully editable.

CALS/SGML support, fast becoming a requirement for anyone dealing with federal agencies, is also promised for a future release.

Graphic Images. FrameMaker imports the usual variety of Mac graphics formats — TIFF (color or gray scale), PICT, EPS, and MacPaint — into anchored or unanchored frames. You can also import EPSI (an encapsulated PostScript format used in the UNIX world), DOS EPS, and Sun raster files. You can bring graphics in by reference (thus cutting down on file size) or actually copy them into the FrameMaker document. Scaling and cropping are fully supported.

Within the program, you can also create graphics, including rectangles/squares, ovals/circles, polygons, arrows, and Bezier curves. You can manipulate the latter by manipulating control points. Graphic objects can be scaled, cropped, rotated (in 90-degree increments), inverted, and grouped. There are 16 fill patterns. A serious shortcoming is that fills are not, and cannot be, specified by percentages. You simply have to accept what Frame supplies.

The Bottom Line. There are some things I wish FrameMaker did better. The

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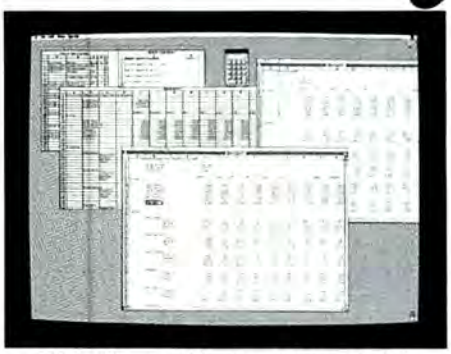

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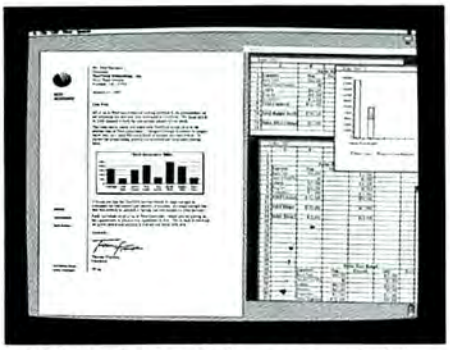

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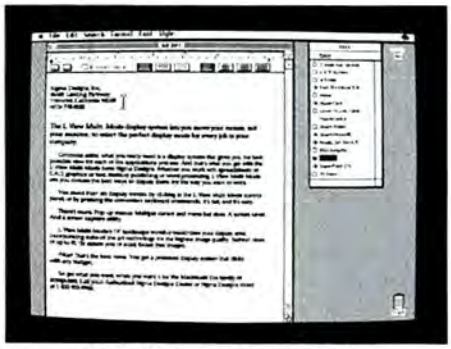

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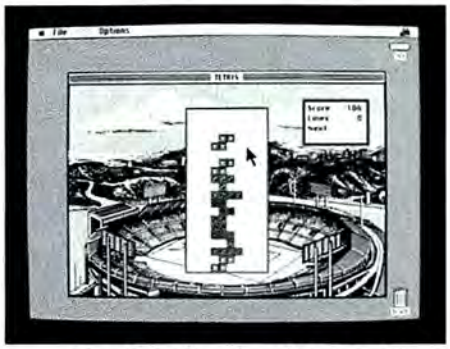

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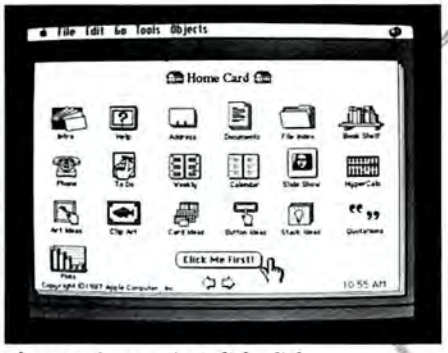

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program's window handling is sometimes quite annoying, especially during spell-checking. The spelling-checker window frequently hides the word in question. Maybe this is why Frame recommends a full-page monitor, but even with a two-page display I found myself playing touch tag with the spelling-checker window far too often.

There are no draggable ruler guides — tools that most desktop publishers find indispensable. It would be great if you could set certain tool palettes or the format catalogs to open with a document, but you can't. FrameMaker doesn't make tables gracefully — an amazing oversight in a program that in most respects is the ideal platform for producing technical documentation.

Aside from these omissions, I strongly recommend FrameMaker. It's one of the finest pieces of Mac software I've seen in the last two years. It's nearly in the same league as Adobe's Photoshop (and Adobe might agree, because it uses FrameMaker for its documentation). Its indisputable prowess in cross-referencing, tremendous support for long-document processing, and numerous other bells and whistles make it a winner.

— Gregory Wasson

Get Info

FrameMaker ★★★★½
Published by: Frame Technology, 1010 Rincon Circle, San Jose, CA 95131; (408) 433-3311.
Version: 2.1.
List Price: $995.

Frame to Frame

Because Frame Technology first baptized FrameMaker in the UNIX waters of Sun Microsystems and NeXT, it may not be unusual for Mac users, at least in larger companies, to have to network their Macs with UNIX platforms and transfer FrameMaker documents between them. Frame promises considerable program compatibility across platforms. MacUser Labs NetWorkShop took a look to determine what limitations and problems a networked configuration might involve.

We networked a Mac IIci (4 megabytes of RAM), a NeXT computer (8 megabytes of RAM), and the new Sun SPARCstation IPC (24 megabytes of RAM, running under SunView), using Ethernet. File transfers were made with TCP/Connect II, an implementation of FTP (File Transfer Protocol) for the Mac.

The Mac and NeXT versions of FrameMaker each cost $995, and the Sun version is pricey at $2,500. Frame markets both SunView and X Window versions for the Sun systems. A version for IBM RISC 6000 workstations is planned, but no release date has been announced, and it will involve hardware ranging in price from $13,000 to $74,000.

There is little difference in functionality in any of the packages. The Sun/NeXT software has a built-in macro capability that's lacking in FrameMaker for the Mac (QuicKeys or Tempo II can be used instead). The NeXT incarnation has a unique look, of course (see figure), but the basics and most of the features are identical across platforms.

Networking machines can involve frustrating complexities of cables and hardware — it took repeated visits from Sun representatives before our relatively simple network functioned properly. Once it was working, we created documents on each of the platforms and transferred them around on the network in a game of computerized musical chairs. Here are some of our conclusions:

Graphics posed the greatest difficulties by far. Mac PICT and MacPaint files had to be saved within a Mac FrameMaker file by use of the FrameImage feature. This command allows these Mac formats to be displayed on the UNIX platforms, but it also enlarges the size of the graphics by as much as 100 percent. Mac EPS files displayed normally on the NeXT machine but had to be converted for use as EPSI files on the Sun machines via Frame EPSF Converter (a utility available by request from Frame Technology) — at least for importing them by reference rather than by copying into the Sun file. In the latter situation, you must save EPS files on the Mac side with FrameImage. If you don't, the EPS image will print normally but appear as a gray box in the document.

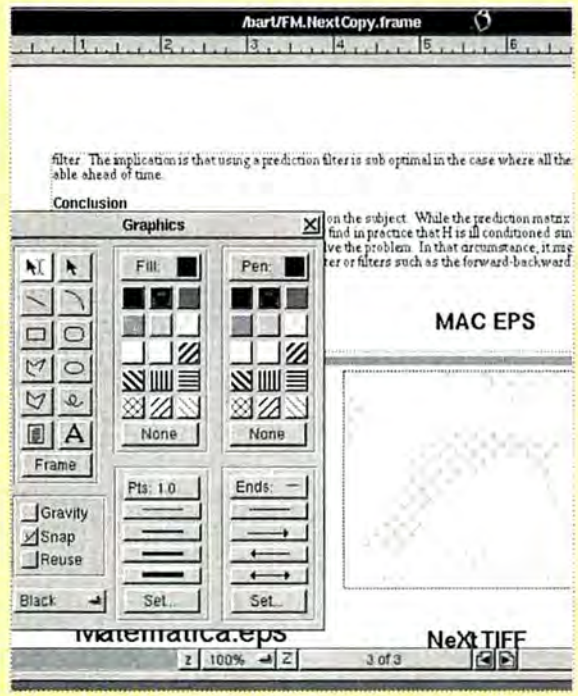
You must also save Mac TIFF files with the FrameImage feature for display on the UNIX platforms. The obvious drawback is, in short, that although Mac TIFF and PICT images could be viewed on UNIX machines with a bit of mucking around, they printed from those machines as 72-dpi bit maps. Spot-color or color images placed in Mac documents did not display as color on the other two platforms, but such documents could be imported to the UNIX machines, modified, and then brought back to the Mac without any loss of color information. Sounds scary, but it works.

EPS graphics created in the NeXT environment did not preview on the Mac and Sun machines, but they did print. NeXT TIFF files transferred to the Mac without any noticeable problems. NeXT snd files could be used in FrameMaker documents, but they didn't transfer to the other platforms.

Sun raster files, graphics created with popular Sun programs such as TopDraw Island Paint or Island Draw, all transferred perfectly to the Mac and NeXT machines.

Text transfers were less problematic, but some anomalies appeared in transfers from the Mac to the NeXT, with characters occasionally being changed into Times Roman from another font. FrameMath equations always transferred correctly from one platform to another.

In short, FrameMaker lets you successfully hook your Mac into a UNIX environment, but you shouldn't expect absolute and transparent seamlessness.



Although the NeXT version of FrameMaker is identical to the Mac version in terms of features, it has a look all its own.

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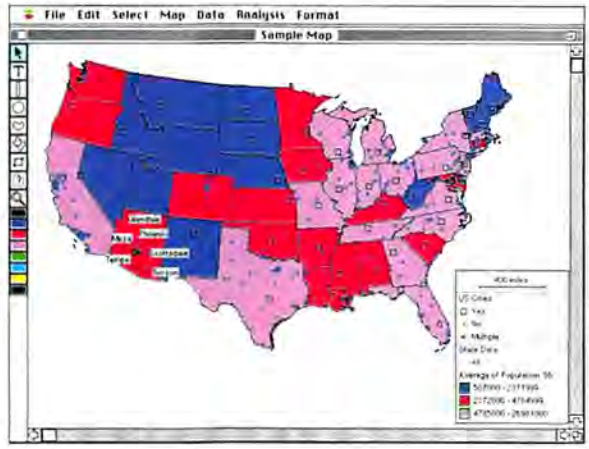
DATA ANALYSIS

GeoQuery

GeoQuery can help you map where you are and where you're going.



GeoQuery is a fine mapmaking and geographic data-analysis program that produces full-color maps of the U.S. to help you pinpoint regional business data. Comparisons such as this one between major customers and census data can help you identify new strategic outlooks for your business.

So many slick graphics programs are available for the Mac that too often one particular genre of graphics applications gets overlooked. Yet one of these, mapmaking, was one of the first tasks that made my Mac a real business machine — even when the only two programs I owned were MacPaint and MacWrite. Even now, I still like drawing maps, and I've created some of my most meaningful maps with Odesta's GeoQuery.

Mapping the Most of It. GeoQuery is more than just a mapping tool for the United States; it's a geographic data-analysis tool. The basic disk set comes with zip-code-keyed atlases for the continental United States, Alaska, and Hawaii. You can create markers, called pushpins in GeoQuery, from any ASCII-formatted text file or Clipboard data that contains a zip-code field. Corporate users will appreciate GeoQuery's embedded CL/1 capabilities for retrieval of information in minicomputer databases.

The program's graphing capability helps you visualize the geographic dispersion of your sales force, clients, or even relatives. Imported data can have a label and a type; types are used to group elements for abstract data views. If you were examining retail stores in the eastern U.S., for example, your data might have types called Bloomingdale's, Sears, Macy's, and so on. Their labels, however, could be more specific, such as "5th Avenue Macy's." When pushpins are first loaded, they do not display the detail associated with them, but using the Who? tool and selecting all or part of the map reveals their labels.

The zip codes are accurate to about ±2.5 miles. You can completely control your map's scale, with boundaries based on the size of your current page setup, by double-clicking on the map's legend and entering a new value for miles per inch. The Landmark feature lets you create a pushpin for anything with a zip code and can help you get a perspective on your own pushpins (and probably help your children get high marks on their geography papers). Double-clicking on any pushpin with the snooper tool reveals its associated record, and you can calculate mileage from pushpin to pushpin (as the crow flies) with the ruler tool.

If pinpointing areas on a map is not what you have in mind, you might want to create shaded regions to reflect sales data, record counts, or any other type of numeric data. Each state has a region name, and you can develop custom regions with circular or irregular outlines. Custom regions with names can be loaded directly from your data. Shading is based on the count of records, the sum of calculated records for a region, or the average of the calculated fields. You can also combine several files — shaded states might reflect the sales dimension, whereas pushpins might reveal which customers reside in the shaded region.

You can split off any region from the main map so it becomes the primary focus of your attention, and you can subdivide regions on the fly for a more refined look. The program can produce various reports that summarize your pushpin data in a region or group of regions.

Even if you don't deal in zip codes, GeoQuery can still be a useful tool. Optional atlases for regions ranging from the Pacific to New England are available, along with specialized atlases for ADI (Area of Dominant Influence), DMA (Designated Market Area), and MSA (Metropolitan Statistical Area). Atlases with the counties of individual states are also available. Prices for these supplemental atlases range from $100 per state to $475 for specialized versions.

Off the Great Divide. Although GeoQuery does an excellent job of creating maps, a few technical points could be improved. GeoQuery plot data is kept on-disk and not in memory, which means input files are in use while plots are active. I wanted to plot the location of a user-group membership list and also shade states according to user density. I dumped my Double Helix 3.0 report to disk and found that once I had plotted the locations of the membership, I needed to duplicate the file for shading, because it was already in use for the pushpins.

The other problem was that I had to dump data from Double Helix 3.0 at all. The Mac has no dominant dBASE III-type of database-file standard, so most database programs on it don't read much more than ASCII text or SYLK files, but I would think Odesta could at least get GeoQuery to read its own Helix format. The program could also use a more global perspective now that world markets, not just domestic markets, are so important to the economy.

The Bottom Line. GeoQuery is an excellent entry-level mapping tool and geographic data-analysis program. It produces clear maps that help you visualize your data and has a simple interface that lets you concentrate on your data rather than on the intricacies of learning the program.

— Daniel W. Rasmus

Get Info

GeoQuery ★★★★

Published by: Odesta, 4084 Commercial Ave., Northbrook, IL 60062; (708) 498-5615.
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List Price: $395.

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2866 File 2.0A ..... 123.
2884 Works 2.00B ..... 179.
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2865 Excel 2.2A ..... 245.
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6382 The Microsoft Office *(CD-ROM)*... 599.

Microsoft Press
7680 Word on Apple Mac Book ..... 18.
7681 DTP by Design for Aldus PageMaker 18.
6500 Excel Money Mgr. Book *(incl. disk)* . 25.

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2981 WillMaker 4.0 ..... 37.

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Paragon Concepts

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7695 Address Book Plus with Binder .... 75.
7698 Fast Forms 2.0 ..... 105.

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7650 Direct Mail 1.0.2 ..... 52.
4780 DAtabase 1.5 ..... 68.

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6268 Grammatik Mac 2.0 ..... $50.

Satori Software

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★Sensible Software ... 30 day MBG

Sensible Grammar or Bookends *ea.* 51.

★Shana ... 30 day MBG

7693 Informed Mini-Manager ..... 54.
7692 Informed Designer ..... 159.

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5439 Endeavour Planner 1.0 ..... 89.

★Softsync ... 30 day MBG

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★Systat, Inc. ... 30 day MBG

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★Zedcor ... 60 day MBG

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4751 Persuasion 2.0 ..... 329.
1330 FreeHand 2.02 ..... 329.
7467 PrePrint 1.0 ..... 329.
7088 PageMaker 4.0 ..... 499.

Altsys

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5425 Art Importer 2.0 ..... 75.
6499 Metamorphosis 1.5 ..... 75.
1195 Fontographer 3.1 ..... 249.

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Bright Star Technology

6093 interFACE 1.0 ..... 249.

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7117 DigiVideo 1.0 *(black & white)* .... 398.
7114 DigiVideo Color ..... 639.

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6957 Adobe Type Reunion 1.0. ..... 38.
5750 Adobe Type Manager 2.0 ..... 55.
6053 Adobe Plus Pack. ..... 109.
6156 Adobe Plus Pack/ATM. ..... 159.
6098 TypeAlign for ATM 1.0.4 ..... 59.
6985 Adobe ATM/TypeAlign Pack ..... 89.
Adobe Type Set 1, 2 or 3. ..... call
1137 Adobe Illustrator 3.0 ..... 349.
6644 Adobe Photoshop 1.0. ..... 499.
5605 TrueForm 2.1 ..... 225.
5001 StreamLine 1.2 ..... 225.
Smart Art I, II, III, or IV ..... *ea.* 88.

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3506 SuperPaint 2.0 ..... 125.
3980 Digital Darkroom 1.1 ..... 248.

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Claris

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4815 Smart Form Designer 1.01V ..... 289.
1117 MacDraw II 1.1 *(w/ATM)* ..... 289.
4814 Claris CAD 1.0V5 ..... 579.

Computer Associates/Cricket

1668 CA-Cricket Graph 1.3.2 ..... 125.
1670 CA-Cricket Presents 2.0 ..... 319.

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6095 DeltaGraph 1.5 ..... 109.

★Deneba Software ... 30 day MBG

6365 UltraPaint 1.0 ..... 125.
1769 Canvas 2.1 ..... 189.

★Dream Maker ... 30 day MBG

4088 MacGallery *(MacPaint)* ..... 27.
4115 MacGallery *(HyperCard)* ..... 27.
4840 Cliptures: Business 1 ..... 69.
4841 Cliptures: Business 2 ..... 69.
7684 Cliptures: Sports 3 ..... 69.

Strategic Mapping

6518 *ATLAS•MapMaker 4.5*–Publication quality color maps of your data. Includes boundaries and data for states, counties, world countries. Plots locations and data for zip-coded address files. *MacUser* 5 Mice rating ..... $369.

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WetPaint Clip-Art ..... *ea.* $42.
World-Class LaserType Vol. 1-9 *ea.* 42.
World-Class Fonts! ..... *ea.* 42.

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7736 Studio/8 & Studio/1 Bundle ..... 295.

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6770 MacRecorder Voice Digitizer ..... 89.
2199 MacRecorder 2.01 ..... 159.

★Foundation Publishing ... 60 day MBG

6729 Comic People ..... 21.
6646 Kid Stuff ..... 21.
6728 Comic Strip Factory 1.6 ..... 37.

★Generic Software ... 60 day MBG

4319 Generic CADD Level 1 1.1 ..... 83.
7454 Generic CADD 1.0 ..... 375.

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2417 MacDraft 2.0 ..... 193.
4707 Dreams 1.1 ..... 319.

Letraset

2619 ImageStudio 1.5 ..... 139.
2621 Ready Set Go! 4.5A ..... 165.
4709 LetraStudio 1.5 ..... 275.
6300 FontStudio 1.0 ..... 359.
6302 DesignStudio 1.0 ..... 489.
6301 ColorStudio 1.0 ..... 649.

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7712 MacroMind CD-ROM ..... 125.
6159 MacroMind Accelerator ..... 125.
5087 MacroMind Director 2.0 ..... 439.

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2878 PowerPoint 2.01 ..... 245.

NEC

Image Gallery, Photo Gallery, Type Gallery PS *(CD-ROM titles)* ... *ea.* 246.
6625 Clip-Art 3D *(CD-ROM)* ..... 246.

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7120 VideoPaint 1.0 ..... 279.

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Paracomp's 24-bit version of the best-selling 3D program, may be combined with SwivelArt, to view images in unlimited perspectives.

7441 *Swivel 3D Professional 1.0* ..... $439.
7728 *SwivelArt 1.0* ..... 82.

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7466 Process Color Imaging Guide ..... 49.

Paracomp

7421 DrawTools 1.0 ..... 62.
7728 SwivelArt 1.0 ..... 82.
4597 Swivel 3D 1.1 ..... 295.
7441 Swivel 3D Professional 1.0 ..... 439.
7839 FilmMaker 1.0 ..... 439.

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7828 Exposure Pro ..... 69.

Quark

7612 Quark XPress 3.0 ..... 529.

Softview

7499 if:X Forms Designer 1.0 ..... 169.

★Solutions, Inc. ... 60 day MBG

3446 The Curator 1.05 ..... 71.

★Somak Software ... 30 day MBG

7434 LaserArt CD-ROM Volume 1 ..... 62.

★Springboard ... 30 day MBG

3530 Certificate Maker 2.0 ..... 22.
4497 Top Honors 1.01 ..... 57.
4500 Springboard Publisher II 2.0 ..... 107.

Strata

7773 Stratavision 3D ..... 369.
7772 Stratavision 3D/Renderman Bundle . 999.

Strategic Mapping

6518 ATLAS•MapMaker 4.5 ..... 369.

★SuperMac Tech. ... 60 day MBG

5625 PixelPaint Professional 1.0.1 ..... 389.

3G Graphics

3942 Images with Impact: Graphics 1 ... 50.
4583 Images with Impact: Business 1 ... 65.
6379 Images with Impact: Accents ..... 65.

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5908 Publish It! 1.2 ..... 222.

★T/Maker ... 30 day MBG

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3633 ClickArt Christian Images ..... 39.
5167 EPS Business Art ..... *special* 69.
7424 EPS Animals & Nature ..... 82.

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6576 Vietnam Remembered *(CD-ROM)* .. 69.
6370 Quick Art *(CD-ROM)* ..... 175.

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6512 SnapJot 2.0 ..... 32.

★Zedcor ... 60 day MBG

3986 DeskPaint & DeskDraw 3.0 ..... 115.

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6171 *MacPrint 1.23*–Lets you use any HP printer with your Mac. For a limited time, buy MacPrint 1.23 and get MacEnvelope 4.2, an envelope printing utility, absolutely free . . **$94.**

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★Affinity Microsystems ... 60 day MBG
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7835 Tempo II Plus . . . . . 105.
★Aladdin Systems ... 30 day MBG
6169 Shortcut 1.0.2 . . . . . 46.
7504 Programmer's Assistant 1.0 . . . . . 57.
6740 StuffIt Deluxe 1.0 . . . . . 63.
★Aldus/Silicon Beach ... 30 day MBG
5100 SuperCard 1.5 . . . . . 199.
★ASD Software ... 30 day MBG
7085 FileGuard Extended 2.5 *(1 user)* . . 139.
7422 FileGuard Office Pack 2.5 *(5 user)* . 349.
7423 FileGuard Office Pack 2.5 *(10 user)* 579.
★Baseline Publishing ... 30 day MBG
7783 INIT Manager . . . . . 35.
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5737 After Dark 2.0 . . . . . 22.
1541 Stepping Out II 2.02 . . . . . 49.
Borland
1511 Turbo Pascal 1.1 . . . . . 68.
★Bravo ... 30 day MBG
5404 SPAMM 1.1 . . . . . 48.
★Casady & Greene ... 60 day MBG
2269 QuickDEX 1.4D . . . . . 34.
7443 A.M.E. 1.1 . . . . . 159.
7444 A.M.E. 1.1 *(5 user)* . . . . . 509.
7831 A.M.E. 1.1 *(10 user)* . . . . . 849.
★CE Software ... 60 day MBG
4689 MockPackage Plus Utilities 4.4 . . . . 31.
1727 CalendarMaker 3.0 . . . . . 31.
6278 DiskTop 4.0 . . . . . 63.
1729 QuicKeys 1.2 . . . . . 63.
7518 Alarming Events 1.0 . . . . . 85.
★Central Point ... 30 day MBG
5040 Copy II Mac 7.2 . . . . . 23.
5041 Mac Tools Deluxe 1.0 . . . . . $75.
★Connectix ... 30 day MBG
7830 Maxima . . . . . 89.
6123 Virtual 2.03 *(for SE/30, IIcx, IIx, & IIci)* 115.
6122 Virtual 2.03 *(for Mac II, incl. PMMU)* . 188.
★Dantz Development ... 30 day MBG
5255 Retrospect 1.1 . . . . . 148.
★Digitalk ... 60 day MBG
5166 SmallTalk/V Mac 1.1 . . . . . 124.
Dubl-Click Software
1824 Calculator Construction Set 2.05. . . 45.
★Fifth Generation ... 30 day MBG
4287 PYRO! 4.0 *(screen saver)* . . . . . 25.
3955 Suitcase II 1.2.6 . . . . . 49.
7700 File Director 1.0 . . . . . 82.
FastBack II 2.5 or DiskLock 2.0 . . . 118.
★Foundation Publishing ... 60 day MBG
6701 HyperSpeller 1.0 . . . . . 29.
Hyperpress Publishing
4233 Icon Factory 1.0 . . . . . 45.
StepAhead or Script Library. . . *ea.* 57.

Affinity Microsystems ... 60 day MBG
7835 *Tempo II Plus*–Automate nearly any activity within and between Macintosh programs with more than two dozen open-architecture externals, a drop-down macro menu, a full-macro viewer and much more . . . . . **$105.**

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4084 On Cue 1.3 . . . . . 35.
5681 HyperTMON 1.0 . . . . . 57.
4085 TMON 2.8.4 . . . . . 86.
Individual Software
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6171 MacPrint 1.23 . . . . . 94.
★JAM Software ... 30 day MBG
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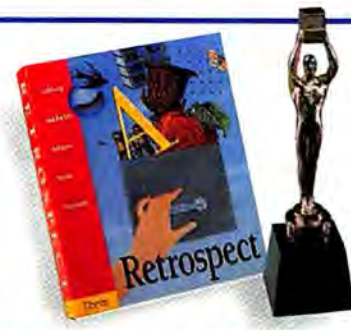
6088 Smart Alarms 3.0 *(1-4 users)* . . . . . 125.
6087 Smart Alarms 3.0 *(5-8 users)* . . . . . 187.
★Kent Marsh Ltd. ... 30 day MBG
5457 QuickLock 2.0 . . . . . 34.
2591 The NightWatch 1.03 . . . . . 85.
6134 MacSafe II . . . . . 107.
★Kiwi Software ... 60 day MBG
6267 KiwiEnvelopes! 3.0 . . . . . 33.
7445 KiwiFinder Extender 1.0 . . . . . 65.



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5255 *Retrospect 1.1*–1989 *MacUser* Editors' Choice Award for *Best Backup Software*. "Retrospect can quickly store data on almost every backup medium. It also makes backup chores as painless as possible" . . . . . **$148.**

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7267 AutoSave II 1.1 . . . . . 28.
7268 POWERicons 1.0 . . . . . 39.
7270 Backmatic 1.1 . . . . . 50.
★MainStay ... 30 day MBG
7722 Marco Polo 1.0.1 . . . . . 152.
★Microcom ... 30 day MBG
4803 Virex 2.71 . . . . . 56.
5885 Virex *(10 Pack)* . . . . . 329.
7459 CarbonCopy Mac *(Single, 2 req.)* . 117.
7465 CarbonCopy Mac *(Twin Pack)* . . . . 152.
★Microlytics ... 60 day MBG
2732 GOfer 2.0 . . . . . 45.

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7465 CarbonCopy Mac (Twin Pack) . . . . . 152.

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2913 Redux 1.62 ... 49.
7116 Rival 1.1 ... 49.
★**Microsoft ... 30 day MBG**
4471 QuickBasic 1.0 ... 64.
★**Millenium Software ... 30 day MBG**
6105 HyperX 4.0 ... 99.
★**Now Software ... 30 day MBG**
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6925 Now Utilities 1.0.5 ... 89.
6739 Prototyper 3.0 ... 184.
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4503 MultiClip 2.0 ... 72.
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6385 On Location 1.0 ... 75.
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★**Salient Software ... 30 day MBG**
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7403 Partner 1.01 ... 56.
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7589 Relational Objex 1.0 ... 149.
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7450 HyperHIT Relational ... 269.

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3448 SmartScrap & The Clipper 2.1 ... 45.
3449 SuperGlue II 2.01 ... 61.
★**Somak Software ... 30 day MBG**
5897 ScriptEdit 2.0 ... 62.
7430 SharpenUp 1.0 ... 62.
★**Spinnaker ... 30 day MBG**
6692 PLUS 2.0 ... 115.
★**SuperMac Tech. ... 60 day MBG**
3383 SuperSpool 5.0 ... 58.
3382 SuperLaserSpool 2.02 ... 87.
3378 SuperLaserSpool 5-Pack 2.02 ... 289.
3377 DiskFit 1.5.1 ... 58.
3379 Network DiskFit 1.5 ... 225.
★**Symantec ... 30 day MBG**
4644 Just Enough Pascal 1.0 ... 52.
5176 Symantec AntiVirus for Mac *(SAM)* ... 67.
5724 Symantec Utilities for Mac *(SUM II)* ... 99.
3421 THINK Pascal 3.0 ... 165.
3420 THINK C 4.0 ... 165.

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6656 *Personality 1.1*–Customize the sights and sounds of your Mac. Change your menu and cursor colors, assign sounds to different Mac functions, select either Mac or 3D interface, and more ... **$49.**

6748 Norton Utilities for the Mac 1.0 ... 84.
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3318 HyperDA 1.2 ... 45.
★**Synex ... 30 day MBG**
7147 MacEnvelope 5.0 ... 57.
6666 MacEnvelope Plus 2.0 ... 159.
★**TGS Systems ... 30 day MBG**
6667 Prograph 2.0 Compiler Version ... 245.
True BASIC, Inc.
3587 True BASIC 2.02 ... 55.
★**Wayzata Tech. ... 60 day MBG**
7679 Disc Tracy Prog. Detective *(CD-ROM)* 75.
★**Williams & Macias ... 30 day MBG**
6926 myDiskLabeler III 3.0 ... 42.
4976 StickyBusiness 1.3 ... 51.
6927 StickyBusiness Plus 1.3 *(bar codes)* 91.
★**Zedcor ... 60 day MBG**
3985 ZBasic 5.0 ... 99.

LEARN & PLAY

Activision
4486 Manhole ... 28.
5127 Manhole *(CD-ROM)* ... 34.
5517 Cosmic Osmo ... 40.

Williams & Macias ... 30 day MBG
4976 *StickyBusiness 1.3*–Most comprehensive labeling program available. Hundreds of templates. Supports many brands and custom labels. **$51.**
6926 *myDiskLabeler III 3.0*–Imports graphics, reads disks, and prints labels in seconds ... **42.**

★**Aldus/Silicon Beach ... 30 day MBG**
3502 Beyond Dark Castle ... $32.
3503 Dark Castle 1.1 ... 32.
★**Ars Nova ... 30 day MBG**
1215 Practica Musica 2.2 ... 69.
★**Baseline Publishing ... 30 day MBG**
7785 Talking Moose ... 23.
★**Beacon Technology ... 30 day MBG**
Gems of The Word 1.0 *(KJ or NI)* ea. 25.
4967 HyperBible 1.0 *(King James)* ... 145.
4968 HyperBible 1.0 *(New International)* 175.
★**Bogas Productions ... 60 day MBG**
6135 Super Studio Session w/Music Library 99.
Bright Star Technology
3961 Talking Tiles 1.0 ... 26.
1402 Alphabet Blocks 1.0 ... 30.
Broderbund Software
4314 Type! 1.0 ... 18.
4540 Ancient Art of War at Sea *(CP)* ... 26.
6516 The Playroom *(CP)* ... 29.
4229 Carmen Sandiego Series *(CP)* ... ea. 29.
4966 SimCity 1.2 *(CP)* ... 29.
5871 SimCity Supreme 1.2C ... 47.
Geometry 1.2 *(CP)*, Physics 1.2 *(CP)*, Calculus 1.2 *(CP)* ... ea. 58.
5237 Whole Earth Catalog *(CD-ROM)* ... 89.

TGS Systems ... 30 day MBG
6667 *Prograph 2.0 Compiler Version*–1989 Eddy Award winning visual programming system. Includes powerful OOP language, interface builder, and compiler. Supports toolbox and links with external C code ... **$245.**

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Carina Software
5726 Voyager 1.2 ... 88.
★**Casady & Greene ... 60 day MBG**
2268 Crystal Quest 2.2X ... 29.
7495 Mission Starlight ... 29.
7498 Sky Shadow ... 29.
Coda Music Systems
5854 MusicProse 1.01 ... 186.
5604 Finale 2.0 ... 549.
Davidson & Associates
1734 Math Blaster! 1.0 *(CP)* ... 29.
6128 Math Blaster Mystery *(CP)* ... 29.
★**Electronic Arts ... 30 day MBG**
6716 Pipe Dreams ... 17.
6663 Sands of Fire ... 32.
6594 Starflight ... 39.
1846 Deluxe Music Construction Set 2.5 ... 84.
★**First Byte ... 30 day MBG**
5294 Puzzle Storybook 1.0 *(ages 3-8)* ... 27.
5293 Dinosaur Discovery Kit 1.0 *(ages 3-8)* 27.

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KidsTime 1.2, American Discovery 2.3, NumberMaze 1.1, KidsMath 1.1. *ea.* 26.
2271 ConcertWare+ MIDI 5.1 . . . . . 98.

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7771 Webster's Dictionary *(CD-ROM)* . . 159.

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Word Torture - Beginner to Advanced *(Span., Fren., Germ., Ital. & Rus.)* *ea.* 29.
Pronunciation Tutor - Beginner *(Spanish, French, German)* . . . *ea.* 35.
Verb Tutor - Intermediate *(Spanish, French, German)* . . . *ea.* 42.
7472 Russian Noun Tutor *(w/sound)* . . . . 59.
6611 Kanjimaster - Beg. *(Japanese)*. . . . 105.
7473 Learn to Speak French *(CD-ROM)*. 175.
7829 Learn to Speak Spanish *(CD-ROM)* 175.

Micrologics ... 60 day MBG

7820 *Random House Encyclopedia*–Software version of the popular encyclopedia. Access other reference works, such as Micrologics Inside Information, from within this program. Disk based–no CD-ROM drive required. **$68.**

Individual Software

7425 Training for Microsoft Word 4.0 . . . $35.
4990 Training for PageMaker 3.0 . . . . . 35.

★Inline Design ... 30 day MBG

5870 Bomber 1.3 *(includes headphones)* 32.
7622 Darwin's Dilemma. . . . . 32.

★Learning Company ... 30 day MBG

2670 Reader Rabbit 2.2 *(CP) (ages 4-7)*. . 30.
5453 Talking Math Rabbit 1.0 *(ages 4-7)* . 30.

★Microsoft ... 30 day MBG

2868 Flight Simulator *(CP)* . . . . . 32.

Miles Computing

5253 The Puzzle Gallery . . . . . 26.
2765 Fool's Errand . . . . . 32.

Mindscape

4083 Balance of Power 1990 *(CP)* . . . . . 29.
4596 Deja Vu II *(CP)* . . . . . 29.

★Penton Overseas ... 30 day MBG

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5173 QuickMail 2.2 *(10 user)* . . . . . 315.

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1673 CompuServe Navigator 3.0 . . . . . 49.
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5834 Connect 1.5 for the Macintosh . . . . 63.

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4842 MacLink Plus/Translators 4.5 . . . . . 98.

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7785 *Talking Moose*–Humorware for the Mac 23.

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6758 DoveFax Desktop . . . . . 279.
FastNet III, SE, or SE/30 . . . . . *ea.* 375.

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1785 Desktop Express 1.03 . . . . . 94.

★Farallon Computing ... 30 day MBG

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4867 Timbuktu 3.1 30-Pack . . . . . 1285.
4866 Timbuktu/Remote 2.0 . . . . . 123.
6371 Timbuktu/Remote Access Pack . . 845.
2202 PhoneNET to LocalTalk Adapter . . . . . 8.
5664 PhoneNET StarConnector. . . . . 17.
6273 PhoneNET StarConnector 10-Pack . 129.
2203 PhoneNET Connector *(DIN-8)* . . . . . 31.
4869 PhoneNET Connector 10-Pk *(DIN-8)* 198.
2204 PhoneNET Connector *(DB-9)* . . . . . 31.
5251 PhoneNET CheckNET . . . . . 64.
2206 PhoneNET StarController 300 . . . . . 825.
6687 PhoneNET StarController-EN . . . . 1599.
5893 Portable Pack . . . . . 329.
6778 Remote/Wakeup Cable . . . . . 33.
6766 MediaTracks . . . . . 189.
6767 MediaTracks Multimedia CD Pack . 319.
6768 MediaTracks Multimedia Pack . . . . 319.

★Freesoft ... 60 day MBG

6115 White Knight 11. . . . . 85.

Hayes

2300 Smartcom II 3.1C . . . . . 84.
2307 Smartmodem 2400. . . . . 349.
6655 V2400 Baud Modem . . . . . 469.
5991 V9600 Baud Modem. . . . . 719.

Insignia Solutions

7557 Access PC 1.0 . . . . . 82.
7058 SoftPC-AT/EGA Module . . . . . 125.
4089 SoftPC 1.3 . . . . . 245.
6688 SoftPC for the Mac Portable . . . . . 245.

Intel Corporation

5119 2400EX Modem . . . . . 179.
6265 2400EX with QuickLink II . . . . . 195.
6420 2400EX MNP Modem. . . . . 229.
6650 2400EX MNP with QuickLink II . . . 249.

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5858 Microsoft Mail 2.0 Workstation. . . . 83.
5856 Microsoft Mail 2.0 Server. . . . . 245.

★Nuvotech ... 60 day MBG

3000 TurboNet ST *(DIN-8)* . . . . . 30.
6751 TurboNet ST *(12-Pack)*. . . . . 279.
5277 TurboBridge . . . . . $319.
6750 NuvoLink II . . . . . 275.
6272 NuvoLink SC . . . . . 309.

Orchid Technology

6949 OrchidFAX Modem. . . . . 459.

★Practical Peripherals ... 30 day MBG

3102 2400 Baud External Modem . . . . . 179.
5285 PM 2400SA MNP Modem . . . . . 209.
3089 Mac Communications Pack 1.5 . . 225.

★Shiva ... 30 day MBG

3444 NetSerial X232 . . . . . 275.
4347 NetBridge. . . . . 339.
4942 TeleBridge . . . . . 339.
3443 NetModem V2400 . . . . . 429.
6917 NetModem V.32 . . . . . 1429.
6519 EtherGate. . . . . 1629.

★Software Ventures ... 30 day MBG

3455 MicroPhone II 3.0 . . . . . 215.

★Solutions, Inc. ... 60 day MBG

6721 MailMaker 5 User Pack 1.1 . . . . . 117.
6720 FAXGATE Plus 1.1 . . . . . 239.

★Synergy ... 30 day MBG

6618 VersaTerm 4.1.1 . . . . . 88.
6619 VersaTerm-PRO 3.1.1 . . . . . 174.

Farallon Computing ... 30 day MBG

6766 *MediaTracks*–Lets you record Macintosh screen activities into "tapes". You can easily edit and add text, graphics, and sound to your tapes, which your audience can watch and listen to at their convenience. . . . . $189.

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4598 TOPS FlashBox . . . . . 118.
3723 TOPS Mac 2.1 *(limited supply)*. . . . 137.
3720 TOPS Flashcard . . . . . 155.
7057 MacPrint TOPS Network Version 1.0 165.
6264 TOPS Networking Bundle 3.0 . . . . 187.

★Traveling Software ... 60 day MBG

3729 LapLink Mac III Connectivity Pac. . 119.
6741 LapLink Mac III Network Pac. . . . . 185.

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7433 Scanner Kit w/Digital Darkroom . . 259.
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6686 UPS 370ci . . . . . 295.

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OmniSpell or OmniDraft. . . . . *ea.* 69.
6661 OmniProof . . . . . 105.

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7344 Rollermouse *(ADB)*. . . . . 79.

★CoStar ... 30 day MBG

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6067 LabelWriter Labels . . . . . 11.

★Datadesk ... 30 day MBG

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6901 Switchboard *(modular keyboard)* . 175.
MAC-101 Keyboards . . . . . *ea.* 129.

GDT Softworks

7687 Mac Daisy Link. . . . . 59.
6256 PrintLink Collection 3.01 . . . . . 59.
6151 JetLink Express 2.0 . . . . . 89.

Hewlett-Packard

6514 HP DeskWriter Printer. . . . . 759.

★Kensington ... 30 day MBG

Turbo Mouse 3.0 *(Plus or ADB)* *ea.* 109.

Koala

2593 MacVision 3.0. . . . . 259.

Kodak

6730 DICONIX M150 Plus Printer . . . . . 489.

★Kraft Systems ... 60 day MBG

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6099 ADB Trackball *(with foot pedal)* . . . . 79.

Freesoft ... 60 day MBG

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6682	Hard Top ImageWriter II	16.
7413	Mac IIcx/ci Monitor Stand	40.
7417	Cordless Mouse	89.

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1725	Mac SE Ext. Keyboard Cover set	10.

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6091	The Organizer	199.

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6733	GFP-3 *(Glass Filter Plus-Mac Plus, SE)*	65.

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2379	MacLuggage Imageware II	49.
2381	MacLuggage Macinware SE	75.
6129	Ultimate SE/Ext. Carrying Case	79.
	Ultimate SE/Ext. Neon Case *(available in green, pink or yellow)* ea.	89.

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2573	Tilt/Swivel *(platinum)*	22.
4973	Power Tree 20	27.
2559	Apple Security Kit	33.

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7114 *DigiVideo Color*–NuBus board displaying real-time video in color or B&W. Features 98-channel cable ready tuner with full sound, MultiFinder compatibility, HyperCard support & DA with 24-bit screen capture option. **$639.**

2566	System Saver Mac *(platinum)*	$63.
2567	System Saver Mac *(beige)*	63.
2546	A-B Box *(DIN-8)*	63.
4643	Mac II Stand and Cable Kit	64.
6763	SE Radiation/Anti-Glare Filter	52.
5064	Apple Color Monitor Polarizing Filter	63.

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4470	Fanny Mac QT	55.

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3261	ImageWriter II Ribbon Multi-4-Color	9.
3270	ImageWriter II Rainbow 6-Pack	20.
3260	ImageWriter LQ Black Ribbon	17.

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4017	ImageWriter II Cover *(navy)*	11.
4018	LaserWriter II Series Cover *(navy)*	17.
4012	High Trek ImageWriter Carry Case	49.
4013	High Trek Mac Plus Carry Case	59.
4014	High Trek Mac SE & Ext. Kybd. Case	69.
4862	SE Protection Pak *(ext. keyboard)*	75.

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5456 *45 Meg Removable Drive*–Offers the convenience of removable media with the reliability of Winchester technology. Features the popular Syquest mechanism & includes 1 cartridge. **$669.**

5736 *45 Meg Removable Cartridge* ..... 89.

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3617	Mac Plus/SE Carry Case	55.
4015	Mac SE & Ext. Kybd. Carry Case	69.
6116	Mac IIcx Carry Case	75.

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6200	Isobar 6 *(surge suppressor, 6 outlets)*	59.

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6148	3½" DS/DD Disks 3 Pak *(30)*	30.
3298	3½" HD Disks 1.44 Meg *(10)*	22.
6375	3½" HD Disks 3 Pak *(30)*	56.
6659	QD2000 40 MB Data Cartridge	19.

★MAXELL ... 60 day MBG

2792	3½" DS/DD Disks *(10)*	14.
2793	3½" HD Disks 1.44 Meg *(10)*	27.

Abaton ... 30 day MBG

7432 *Scan 300/GS*–Flatbed scanner capable of 256 shades of true gray-scale. Mac, IBM, and NeXT compatible with optional interface kits. Compatible with most OCR packages . **$999.**

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6592	44 Meg Removable Cartridge	85.

★3M ... 60 day MBG

3943	DC2000 40 MB Data Cartridge	20.

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7149 Xceed IIci - 128 Cache Card ..... 589.
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6620 MacTRAC. ..... 65.
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7411 Pacific MacPage. ..... 425.
RasterOps
7464 ColorBoard 208 ..... 395.
7463 ColorBoard 264 for Mac II. ..... 579.
7469 ColorBoard 264 for SE/30. ..... 689.
7457 Video ColorBoard 364 ..... 1549.
7457 RasterOps 8L ColorBoard. ..... 1549.
7468 ClearVue/GE System for Mac II .. 1759.
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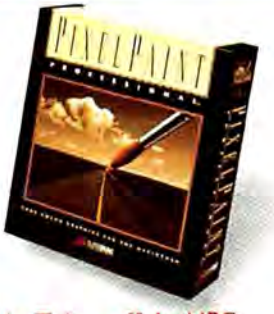

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6744 CDR35 CD-ROM Portable Drive . . 399.
6743 Mac Driver Kit. ..... 64.
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7746 Quantum 40 Meg Int. for ci & cx . . . 375.
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7745 Quantum 40 Meg Int. for SE & SE/30 375.
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7451 Dataframe XP 200 Hard Drive . . . 1399.
5451 Dataframe XP 330 Hard Drive. . . 2369.
Toshiba
6749 XM 3201 CD-ROM Drive. ..... 899.

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4865 Address Labels 3½" x 15/16" *(3750)* . 15.
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OCR

CDP 9000/TopScan and Parallel Reader

A pair of high-end OCR packages teach the Mac to speed-read.

Calera's CDP 9000/TopScan combination is the speed king of high-end OCR. It's consistently faster than Caere's Parallel Reader and is much easier to set up.

OCR (optical character recognition) has removed a considerable amount of the drudgery from translating printed material into electronic documents. Most Mac OCR software has been best suited for low-volume situations or individuals.

Now two new products from Calera Recognition Systems and Caere combine hardware and software to bring increased power, speed, and sophistication to high-volume OCR users. Calera's CDP 9000/TopScan package and Caere's Parallel Reader (both examined briefly in the July '90 issue, page 124) now vie for this lucrative market.

CDP 9000/TopScan. Not for the weak-walleted (the configuration I looked at lists for $31,950), Calera's top-of-the-line entry in the Mac OCR market consists of the CDP 9000 (the "less expensive" CDP 6000 lists for a mere $19,950), a large scanner unit that you connect to your Mac with a SCSI cable, and TopScan software that you install on your hard disk. The system requires at least 1 megabyte of RAM, 2 megabytes if you plan to use MultiFinder. Setting up the hardware and software takes less than 30 minutes, and all the necessary cables are shipped with the hardware. The CDP unit is not internally terminated, but Calera includes a SCSI terminator.

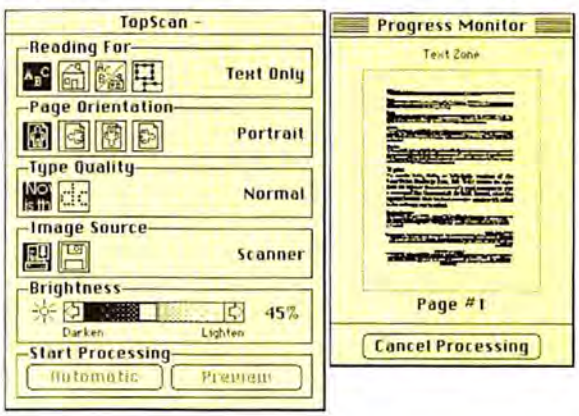
Once you've plugged everything in and turned it on, OCR scanning is a snap. Place up to 50 pages in the bin at the top of the CDP unit, and then launch the TopScan software (which works only with the CDP hardware). Select your settings and click on OK, and the pages are pulled through the scanner and fall into a drop tray attached to the front of the device. Recognition processing takes place within the scanner, not on your Mac, and the whole process is blazingly fast and highly accurate.

All tests conducted for this review were performed on a Mac IIcx equipped with 5 megabytes of RAM. The documents used to obtain the speed and accuracy counts shown in Figures 1 and 2 were also scanned with OmniPage 2.1 on an HP ScanJet Plus for comparison.

The CDP 9000 bested the Parallel Reader in every test. For example, the complex-letter test was a 500-word letter with multiple point-size and style changes. The CDP scanned and processed it in 49 seconds, correctly recognizing 90 percent of the text and character formatting. The Caere product lagged along at 2.5 minutes and captured only 82 percent of the text and formatting features. The outcome was much the same when it came to a fax document of similar size. The CDP was more than three times as fast as the Parallel Reader when dealing with dot-matrix material, and it did a far better job of retaining tabs and spacing in the highly formatted programming code used for the dot-matrix test. The CDP also sped through a dense 20-page portion of a thesis about 30 percent faster than the Parallel Reader (5.5 versus 7.8 minutes).

The TopScan program boasts a sleek implementation of the Mac interface that sports several advantages over what OmniPage users are familiar with. TopScan lets you produce nearly fully formatted documents in ten common Mac file types, including MacWrite 5.0, MacWrite II, Word 3.0 and 4.0, WordPerfect, Write Now, and even Excel. You can specify the typeface a file will be saved in and create style sheets of your settings for future use. You can also scan and save text and graphics simultaneously by selecting zones or areas of the page in a preview mode and specifying whether the zone is text, image, or both. You can save all of these as separate documents.

You can create templates of the areas of the page that are to be scanned and



TopScan, the software that controls Calera's CDP series of OCR hardware, features an attractive Mac interface, including a window that previews the current page.

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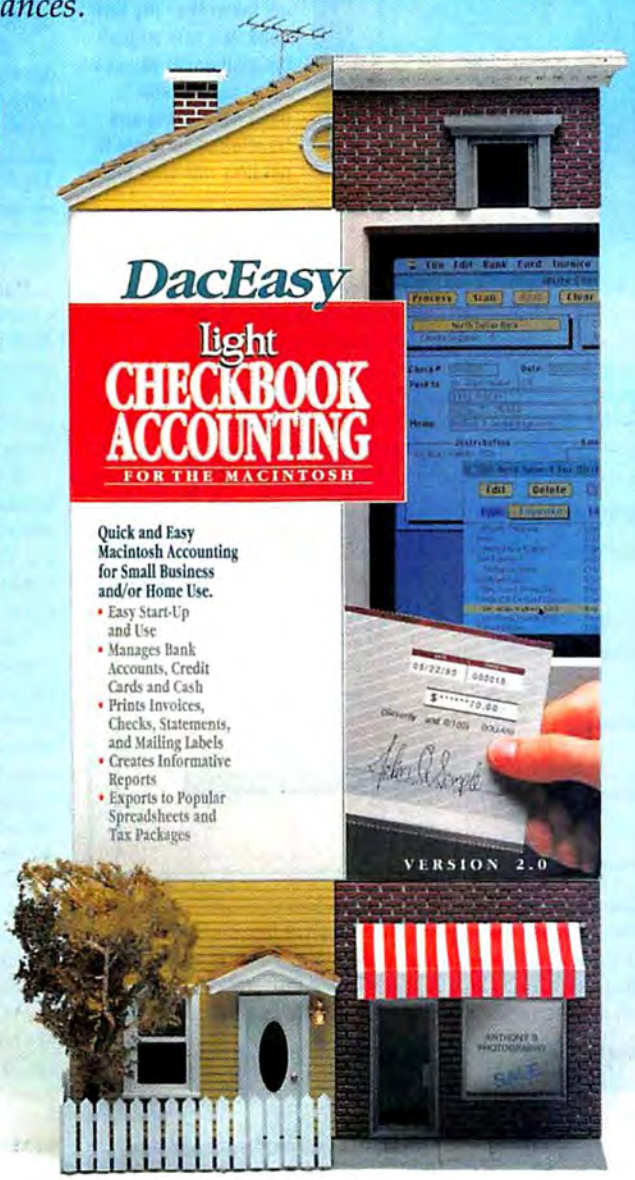

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Media Code: 544

Caere's Parallel Reader is based on an IBM-compatible PC with four parallel OCR cards inside. It's faster than OmniPage is but not faster than the CDP 9000. It's sold with all the equipment you see here, but you still need networking and translation software to get files into your Mac.

spell-checked, and you can even tell TopScan to flag suspect words or characters that might be misplaced (a drop cap, for example), so that you can easily locate them in a word processor. All recognized text retains its point size and style, given the appropriate settings.

With the CDP/9000, it's also possible to batch-process previously scanned files, so you can scan during the day and process overnight. You simply select the Defer Processing option during the initial scan and then issue the Process Deferred Documents command later. You can select as many deferred documents as you want, and you can even set a maximum recognition time so the program won't spend more than a set amount of time per page. This is useful if you've accidentally put a sheet in upside down, for example — TopScan abandons the troublesome page and moves on to recognizing the rest of the scans.

Calera had its act together when it devised this product. And it hasn't taken long for this to come to the attention of some major companies — Apple, for instance. Apple uses the CDP 9000 and TopScan to process the thousands of résumés it receives each month. Your résumé doesn't molder in somebody's file cabinet — it molders in a VAX.

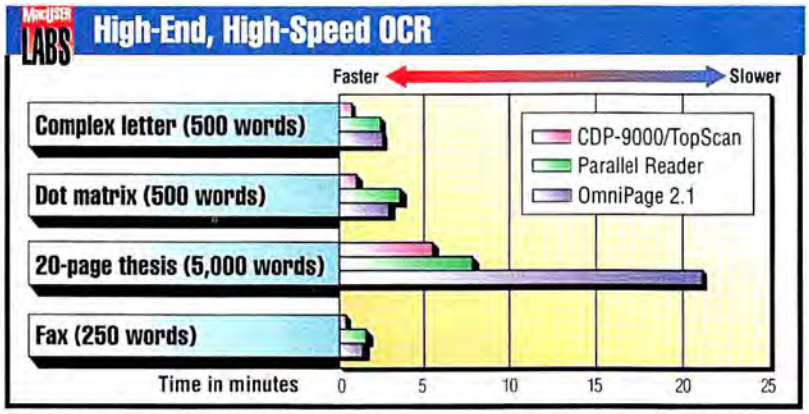
Parallel Reader. Caere all but invented Mac-based OCR when it introduced OmniPage a year and a half ago, and it's now making its bid for the corporate high-end OCR market with a hardware/software combo called the Parallel Reader.

At $10,995, the Parallel Reader might be an attractive alternative for companies unable to justify or pay the hefty price for the Calera system. But there are some rather pronounced differences between the two systems besides the price tag.

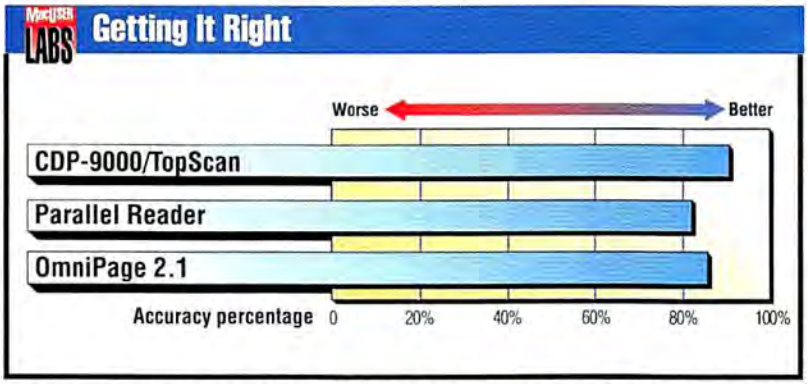
This device, a rather austere-looking black box, is actually an IBM-compatible PC that you network to your Mac. It houses four OCR processing boards (dramatically speeding up multipage scanning, because it can process four pages at a time) and an 80386sx processor. Also included are a 16-bit VGA video card, a 40-megabyte internal hard-disk drive, and a 5.25-inch 1.2-megabyte floppy-disk drive.

You must add on one of the three scanners it supports (the Fujitsu 3093, the HP ScanJet Plus, or the Microtek MSII), an ADF (automatic document feeder), a keyboard, and a monitor. And that's not all. You need networking software (I used TOPS) and cables. And you may have to use file-translating software such as MacLink Plus to convert the DOS files the Parallel Reader deposits on your Mac's hard disk. On the other hand, if you save the scanned files in Word or WordPerfect formats, the Mac versions of those programs can open and convert the files without any problems.

Caere actually installed the configuration I tested (and dealers are supposed to do this for you as well), so I can't comment on how long it might take you to set it up for yourself. But even with everything installed, it took several false starts



Calera's CDP 9000/TopScan combination lives up to its $32,000 price tag: It's blazingly fast. The CDP 9000 beat Caere's Parallel Reader in every test and was easy to use and set up. In production environments or for reading long documents, the CDP 9000 can easily pay for itself. (The OmniPage times are shown strictly for comparison.)



As in the performance tests, the CDP 9000/TopScan combination beat the Parallel Reader, although not as decisively. (The OmniPage results are shown for comparison.)

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before I could convince TOPS to function and the unit to access the scanner properly.

The software? It's essentially OmniPage without the Mac face and minus the ability to check spelling — even though a spelling-checker feature is mentioned in the manuals (Caere plans to implement this feature in a future release). When used for scanning single pages, it roughly matches the performance of OmniPage on the Mac, but as I mentioned previously, it's generally slower — sometimes decidedly so — than the CDP 9000.

It has settings for dot-matrix documents, style retention, and so on but nothing as startling as TopScan's style sheets. You can save scan files in a variety of DOS formats, so the time you save in OCR you may lose during the translation unless you save them in Word or WordPerfect formats, as noted earlier. And as with the CDP, you can scan images and text at the same time, saving them to separate documents. You can store the graphics as either compressed or uncompressed TIFF, but again in DOS format. You need a program such as MacLink Plus to convert them into Mac files.

The Parallel Reader does speed up multipage OCR work, and it allows for batch deferred processing, much as the CDP unit does. I particularly liked the fact that you can pause the Parallel Reader during a scan run when the ADF bin is empty, rather than close the current job as completed. This is great for multipage jobs that the ADF can't accommodate. But the various disadvantages noted earlier tarnish the gleam. In particular, the necessity of dealing with DOS adds to the overall confusion — at least for people accustomed to the Mac way of doing things.

The Bottom Line. If money is not an issue, Calera's unit is really the only way to go. The CDP 9000/TopScan's support of style sheets and its extensive formatting options are exceptional. The duo excels at multipage OCR runs and batch processing.

Caere's Parallel Reader promises the latter features as well — and to some extent it delivers the goods — but it also forces you to do DOS and to translate your files into Mac format. Although the software operates under the relatively friendly environment of a run-time version of Windows, you need considerable DOS background to gear the whole mechanism into motion. It's cheaper than the Calera approach, but it's definitely a kludge solution.

The CDP 9000, on the other hand, offers greater speed, accuracy, *and* convenience. It offers all the instant gratification that the plug-and-play Mac crowd is accustomed to. Your office will never be the same again.

— Gregory Wasson

Get Info

CDP 9000/TopScan for the Macintosh

$$$$$

Manufactured by: Calera Recognition Systems, Inc., 2500 Augustine Drive, Santa Clara, CA 95054; (408) 986-8006.
List Price: CDP 9000/TopScan, $31,950; CDP 6000, $19,950; TopScan only, $2,995.

Parallel Reader

$$$

Manufactured by: Caere Corp., 100 Cooper Court, Los Gatos, CA 95030; (800) 535-7226.
List Price: $10,995.

DRAWING AND PAINTING

Color MacCheese and DeskPaint

Getting 16.8 million colors in a painting program doesn't have to cost you 16.8 million dollars.

Even though the price of 24-bit video cards has plummeted to less than $600, 24-bit painting programs have stubbornly clung to the $500-and-up price range. This opens the market for Color MacCheese and DeskPaint, two inexpensive, full-color painting packages.

MacCheese's name is a good indication of the developers' approach — this isn't a professional artists' tool. It's a simple package that's meant for graphics fun.

DeskPaint, now in its third generation, is a full-featured, precision painting application in DA form. It comes bundled with DeskDraw, its object-oriented equivalent, and there's little you can't accomplish with these DAs together. Version 3.01 is a major upgrade that packs some high-end features I didn't expect, and it's less than 100K in size, smaller than many basic black-and-white applications.

The tools in both programs mimic real painting tools by varying their effect with the speed at which you move them on-screen. Stroking quickly with the paintbrush, for example, yields disconnected strokes of color, whereas slowing down applies paint more evenly.

Both programs add color-manipulation tools to the MacPaint standards. Both have an eyedropper for matching previously used hues, and a blending tool for combining colors. In MacCheese, the blending tool is the water drop; in DeskPaint, it looks like a hand with a pointed finger. In addition to solid and patterned fills, the paint cans also produce fills that gradually change from one selected color (or color saturation) to another. I found MacCheese's color wheel, which mimics Apple's Color Picker, easier to use than DeskPaint's extended color palettes.

Color MacCheese. MacCheese is designed for artistic fun. If you're a sketch artist, a painter, or just a kid having fun smearing colors, MacCheese is for you. It is not intended as competition for PixelPaint or Photoshop. Resolution is limited to 72 dpi, and there are no rulers. Only one document can be open at a time. MacCheese documents are saved in color PICT format, but the program can also open MacPaint documents.

When you first open MacCheese, six palettes appear with your blank document window. Once you're comfortable, you'll want to close those you don't need to reclaim screen space.

MacCheese's tools are responsive — even when you're working in full color. In addition to the standard polygon tool, there's a special tool that draws polygons with any specified number of equal sides. Double-clicking on a tool brings up its Settings dialog box, where you can set its

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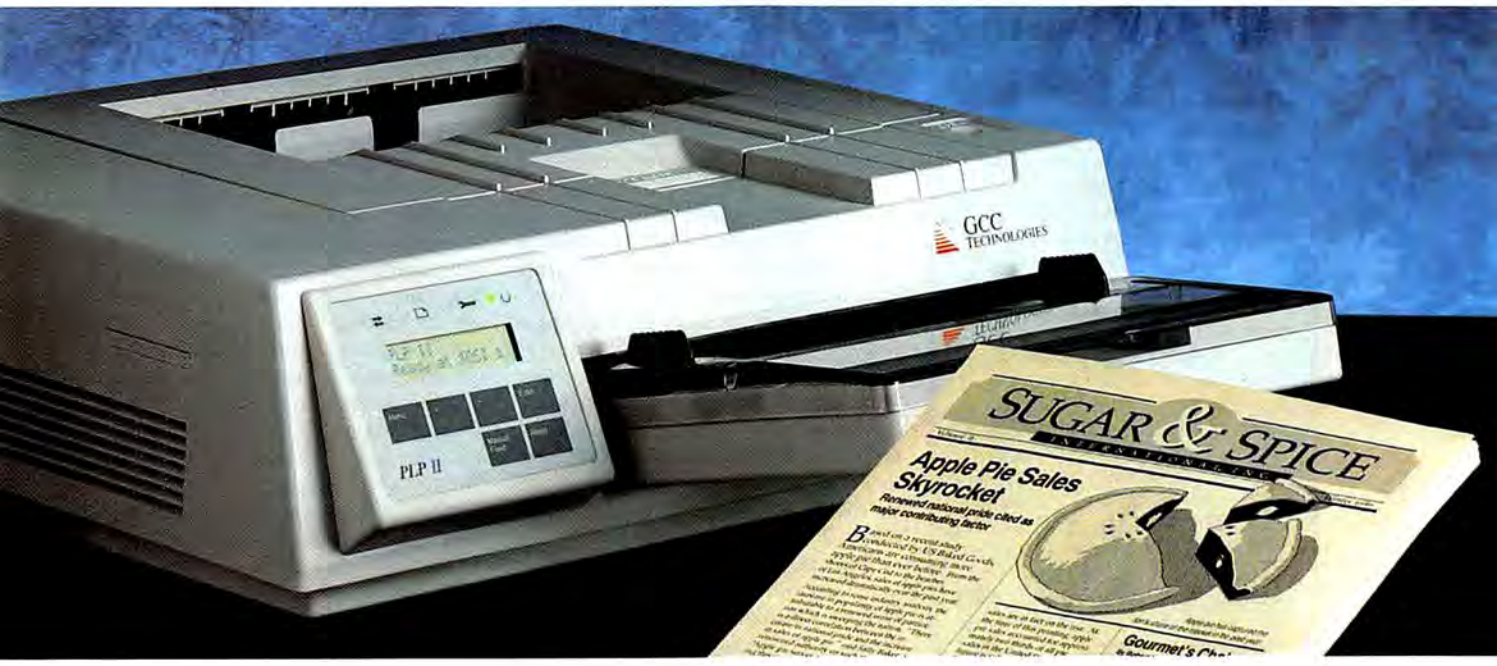

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AD #021117

Up to Date

Changes New and Noted

NanoDISK, an extended-memory utility from Technology Works (reviewed in the September '90 issue, page 92), has been upgraded to version 2.0 and is now available as a stand-alone product. Formerly available only in a bundle with Technology Works' 16-megabyte upgrade kit, the new version lets users create a RAM disk on any Mac with 4 megabytes or more and includes an INIT that lets users run programs such as Microsoft Mail that can't normally run on systems with more than 8 megabytes. Version 2.0. Technology Works, 4030 Braker Lane W., Suite 350, Austin, TX 78759; (800) 688-7466 or (512) 794-8533. $89; upgrade, free to registered owners.

Adobe Type Manager (ATM) has now been bumped up to version 2.0. Improvements include reported speed increases of up to double those of the previous version, better print quality, and easier font installation. Version 2.0 includes a new utility, Font Porter, that lets users install bit-mapped fonts simply by dragging the fonts' suitcase files into the System Folder instead of using the Font/DA Mover. (Suitcase II users, however, can already do this.) Version 2.0. Adobe Systems, 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94039; (415) 961-4400. $99; upgrade, $20 (plus $7.50 shipping and handling) for registered owners.

Timbuktu/Remote, Farallon Computing's remote-access utility, has seen its first major upgrade and now sits at version 2.0. Version 2.0's features are similar to those of the previously released Timbuktu 3.1. Version 2.0 supports v.32 modems and displays the remote screen in a movable, resizable window on the user's desktop, permitting simultaneous viewing and use of remote and local Macs. Other features include improved security with multiple passwords and differing access levels for multiple guests, a callback feature that lets the host computer call a guest to confirm that user's identity, and a guest log that records who used the machine and what they did. Timbuktu/Remote's file-transfer capabilities have been enhanced, and it now supports a wider range of CCLs. Farallon Computing, 2000 Powell St., Suite 600, Emeryville, CA 94608; (415) 596-9100. $195; upgrade, $50 for registered owners or free if version 1.0 was purchased after June 15, 1990.

size, shape, and flow rate. The program has no Font, Size, or Style menus, but double-clicking on the text tool lets you set these attributes.

In addition to the water drop, MacCheese provides another tool for softening the edges where colors meet. The rake randomly swaps colored dots along the edge, rather than smearing the colors together. My favorite MacCheese tool is the transmogrifier, which looks like a ray gun. It creates texture effects within existing expanses of color by spraying a wide variety of hues in the same family as the color over which it is used. To save your mouse-button finger, MacCheese conveniently lets you apply the rake, water drop, or transmogrifier to an entire selected area with a menu command. All the tools work at any magnification from 100 to 900 percent.

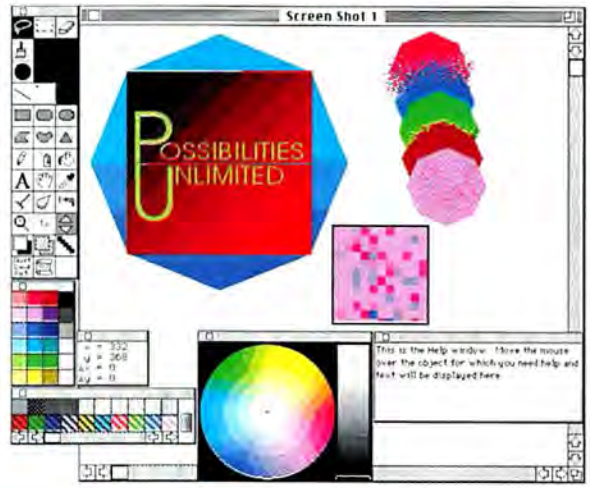
MacCheese's Handy palette, which provides quick selection of 24 unchangeable colors, wasn't very handy. I closed it and placed my favorite colors on the Pattern palette to save screen space. You can turn any selected area of a graphic into a pattern, no matter how many colors it contains, with a single menu command. Only disk space limits the number of patterns you can add to the scrolling Pattern palette. The Coordinates palette provides a rudimentary level of precision by displaying (in pixels) the current cursor position and either the size of a current selection or the distance you've moved it. The Help palette's text constantly changes to explain whatever the cursor is currently pointing at, including tools, palettes, and menu items.

For any selected area, MacCheese supports 90-degree rotations, horizontal and vertical flipping, and changing pixels that match the current brush color to pixels that match the current background color.

DeskPaint. DeskPaint provides the tools professional graphic artists need. The DeskPaint/DeskDraw package comes with tutorial and reference manuals totaling more than 350 pages. You can calibrate vertical and horizontal rulers in inches, centimeters, millimeters, picas, or points/pixels for use as position guides. You can also move them to measure specific objects or areas and return them to their original position. You can specify any resolution up to 4,000 dpi and set different vertical and horizontal resolutions to maximize results from printers with unequal resolution configurations. The tools work at magnifications from 6.25 to 1,600 percent, and this new version supports up to 64 open windows, limited only by memory.

DeskPaint saves and opens MacPaint, TIFF, TIFF-compressed, and PICT documents, regardless of whether they're monochrome, gray-scale, or full-color. Because the program supports so many file formats, Zedcor provides a useful Browse command that lets you browse through or create a slide show from a folder of graphics in any combination of these formats.

DeskPaint's screen is less cluttered than MacCheese's. A single palette combines all functions, including color selection. To circumvent Apple's limitation of a single menu for any DA, each window includes full applicationlike menus below the title bar. Shape tools in the palette appear half-filled. Clicking on the unfilled half causes shapes to be drawn unfilled, regardless of the selected fill color — a



MacCheese's six palettes occupy a lot of screen space. Gradient fills were used for both the octagon and square in the logo on the left. Where one color meets another, one of MacCheese's unique tools was used. The rake randomly exchanged dots between red and blue. The water drop blended the blue and green border.

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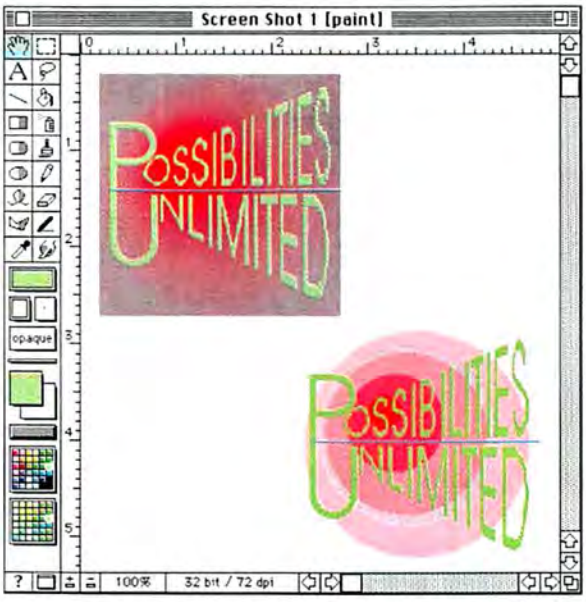


DeskPaint packed the necessary tools to improve this logo. A pattern was used to enhance the gradient fill. Both stretching and one-point perspective were used to shape the text. A higher resolution could have been used for better appearance, but 72 dpi matches MacCheese's resolution. The logo at the upper left was created with 32-bit color, and the one at the lower right was done with 8-bit color.

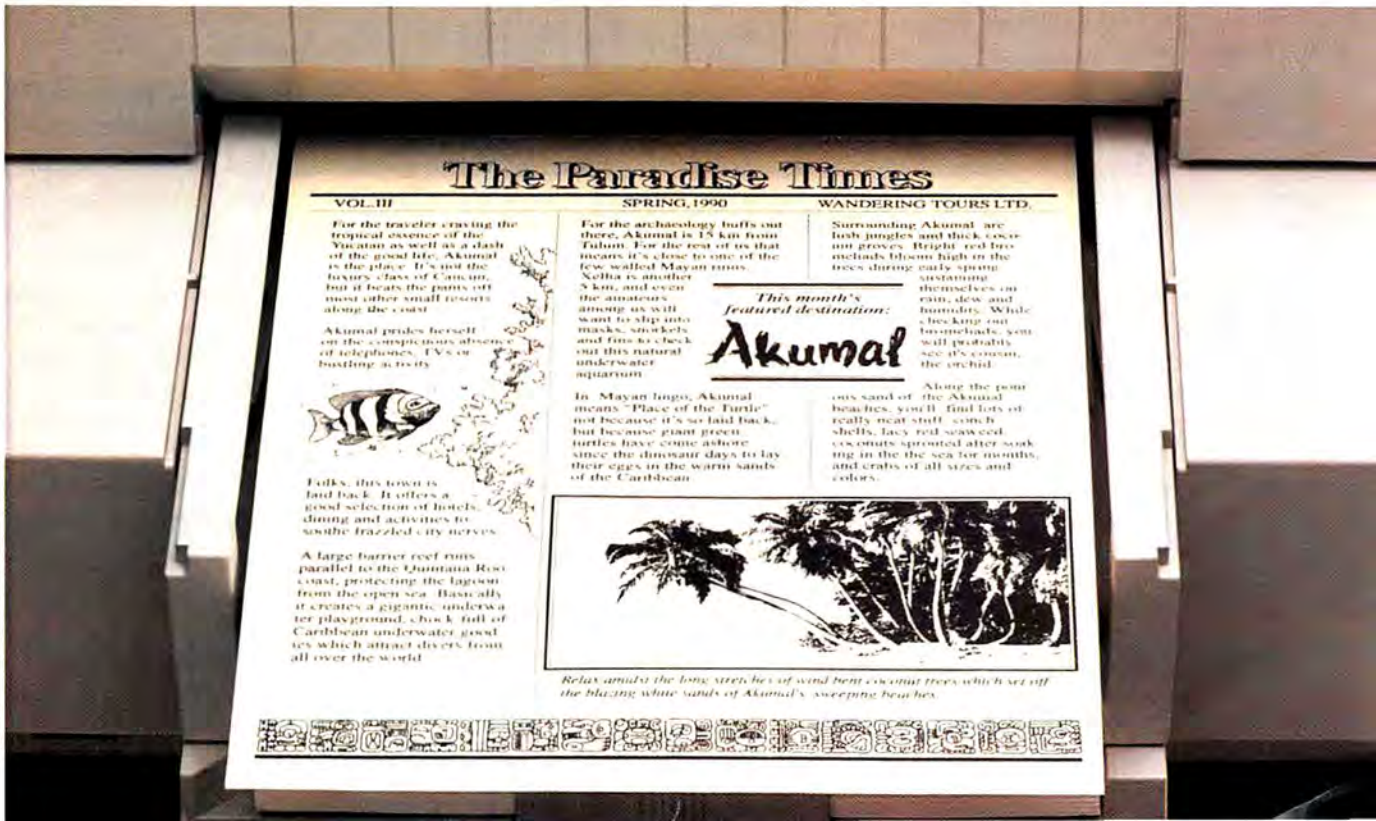
real convenience. You can draw shapes either from the corner or from the center.

The charcoal tool and the spray can are functionally identical, except that the former applies color only when you move it on-screen. (The spray can sprays as long as the mouse button is down, whether the mouse is moving or not.) Although DeskPaint has no transmogrifier, you can achieve a similar effect with several passes of the spray can. Patterns and their palettes are less sophisticated than those in MacCheese. There are six editable fill- and line-pattern palettes, each with 40 patterns, including black, white, and no fill. The editing dialog box supplies an 8-pixel-square section in which to edit or create your pattern in black and white fat bits. When you're in the Color mode, the current foreground color always replaces black and the current background color always replaces white, limiting patterns to two colors.

The auto-trace feature, similar to that in FreeHand or Streamline, converts black-and-white bit-mapped images to object-oriented lines and polygons.

In addition to flipping and 90-degree rotations, DeskPaint's standard image-manipulation repertoire includes scaling by percentage, free rotation, distortion, skewing, slanting, stretching, and 1- or 2-

With the HP DeskWriter, you can



*Suggested U.S. list price. © 1990 Hewlett-Packard Company. PE12005
Documents created using Microsoft® Word and Aldus PageMaker®
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point perspectives. Color manipulations include lightening or darkening images, tracing edges (where colors meet) to create a line drawing from a color picture, inverting images, changing contrast to soften or sharpen images, and creating gradient fills and filters. Gradient fills apply when you're drawing shapes or painting with the bucket. Filters apply gradient tones to any selected area.

You need lots of RAM to work in full color. To get around DA Handler's memory limitations, Zedcor includes with DeskPaint an application shell called Desk. The shell looks like a real application, but it's not. Double-clicking on Desk simply reserves application memory equal to the quantity specified in the Get Info dialog box and then opens the DA, which then has far more memory available than it does under DA Handler.

The Bottom Line. Both these packages work as well in black-and-white as in color, so consider them even if you have only a monochrome screen. They're inexpensive, and you never know when you might upgrade to a color Mac. Even if your Macintosh has 4- or 8-bit color, the programs' dithering capability gives you the luxury of simulating many more colors.

DeskPaint provides far more features than does Color MacCheese and costs twice as much. Should you ignore MacCheese? If you require the rulers and special effects and are willing to spend time learning a full-featured graphics program, the answer is yes. For casual painters or sketch artists who want to get to work immediately, MacCheese is perfect, and it even includes the rake and the transmogrifier! In any event, you can now work in 32-bit color without going broke in the process.

— Darryl Lewis

[As we went to press, we learned that Baseline (5100 Poplar Ave., Suite 527, Memphis, TN 38137; [901] 682-9676) will also be distributing Color MacCheese. The price will be the same. Delta Tao still owns the product and will develop and sell it as well. Delta Tao has been aggressively seeking comarketing arrangements with several other vendors too. Color MacCheese will ship with the Animas line of hand-held color scanners and Studiotronics' ColorSet. — Ed.]

Get Info

Color MacCheese

★★★½

Published by: Delta Tao Software, 760 Harvard Ave., Sunnyvale, CA 94087; (408) 730-9336.
Version: 1.03.
List Price: $99.

DeskPaint

★★★★½

Published by: Zedcor, 4500 E. Speedway, Suite 22, Tucson, AZ 85712; (602) 881-8101.
Version: 3.01.
List Price: $199.95.

have it all. (But keep it to yourself.)

The HP DeskWriter printer puts laser-quality printing right at your fingertips.

With a small size and a $995* price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

The DeskWriter is also designed for easy use with your Macintosh, and has both serial and Apple Talk interfaces. It even includes scalable and outline fonts. Combine that with the DeskWriter's whisper-quiet operation, and keeping it to yourself will be that much easier. So call **1-800-752-0900, Ext. 1004** for your authorized HP dealer.

There is a better way.

HEWLETT PACKARD

MULTIMEDIA

Point of View

Scholastic Software's dynamic history program makes exploring American history interesting and fun.

Most students regard history with the kind of aversion that President Bush reserves for broccoli. The reason may even be similar: History is usually either overcooked or indigestible. History textbooks are written by committees with the goal of avoiding offense to anyone with enough political clout to block the books' adoption. History without controversy is such bland stuff that it's easy to see why nobody can work up much enthusiasm for teaching or learning it. Primary sources, where real history lives, are usually bulky, expensive, hard to locate, and hard to use in a classroom.

A History Lesson. Point of View, from Scholastic Software, is a bold attempt to use the computer to tame an unruly mass of source material for the high-school American-history curriculum. Delivered on eight floppy disks, it includes more than 2,000 pages of documents, hundreds of graphics, and 140 census tables, with tools for searching, accessing, and displaying the data.

The designers could have hacked it out in HyperCard but wisely chose to program a stand-alone application that provides a multiwindow environment with its own hypertext and authoring capabilities. The program supports digitized sound (the package includes a few samples) and can send commands to Pioneer and Sony videodisc players, letting teachers incorporate color graphics and full-motion video from existing educational laser discs into their lessons.

A teacher can use this package for classroom presentations, directly from the computer or from hard-copy transparencies. Students can explore it to answer their own questions, cutting and pasting text and graphics into their essays or presentations.

The main navigational tool in Point of View is the time line, a slider that runs from 1752 to 1990. You can zero in on a specific day by entering the date, and you can move through time in small or large jumps. You can navigate by subject, following programmed Links, or by using the Find View command from the Explore menu.

The program can display different Views: milestone charts, graphs, maps, essays, documents, pictures, and special effects (including sound and video). Milestone Views use topical icons representing 24 categories, from The Arts to Local History, U.S. Events, and World

With the HP ScanJet Plus, you've

The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.

That means 256 shades of gray for the hottest-looking output from your Mac. And it's so easy, too. At the click of a mouse, you can get negative or mirror images, as well as scaling in 1% increments from 4-200%. All for $2,190,* about what you would expect to pay for a 4-bit scanner.

So if you want the richest, most detailed images from your Mac, you've got it made with Hewlett-Packard. Call **1-800-752-0900, Ext. 1005** for your authorized HP dealer.

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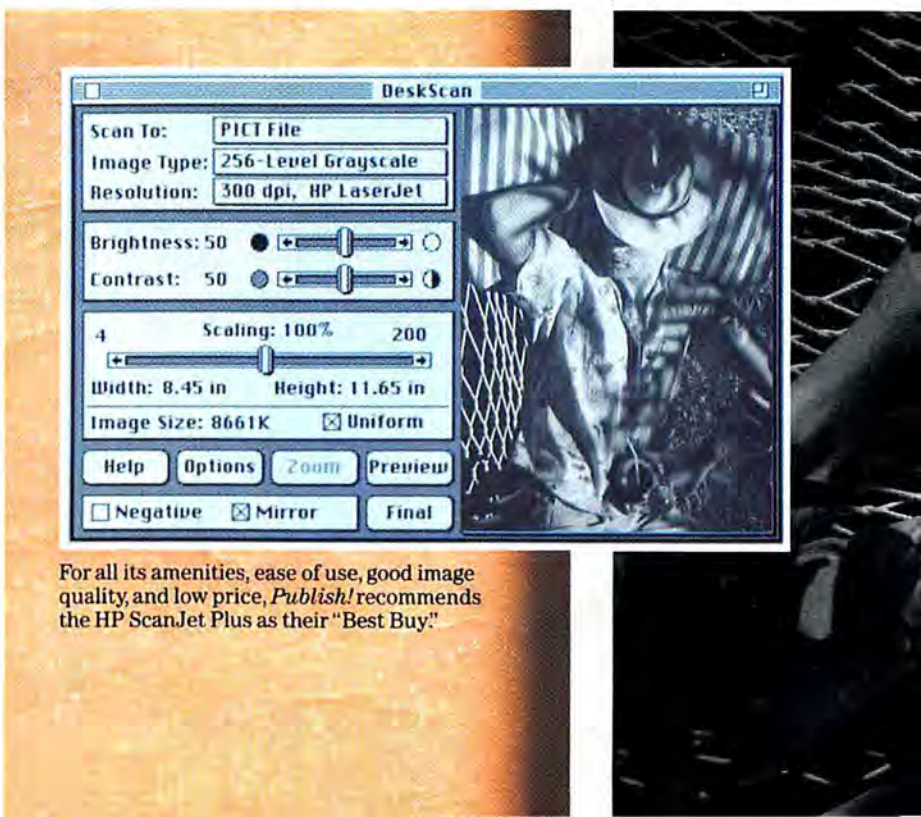
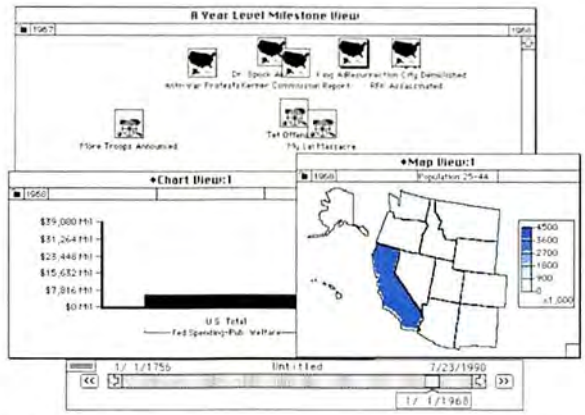


For all its amenities, ease of use, good image quality, and low price, *Publish!* recommends the HP ScanJet Plus as their "Best Buy."

Events. The Local History milestones trace the story of one small town — Shrewsbury, Massachusetts. You select the year you want to study by using the sliding time line. As you change years, the various views you have on-screen update to display the appropriate data for the newly selected year. What's more, the program's charts let you reverse the process; using a census chart, for example, you can stretch the bars to a particular population and the time line will snap to the year that matches that value.

Point of View is not just a canned database; it provides a flexible authoring environment that lets users edit existing data sets and create new ones. If you don't agree with the design team's choices, you can scan in your own graphics and enter your favorite essays and documents. The program even has an icon editor for drawing your own milestone symbols. Scholastic plans to release two additional packages for $150 each: The Civil War and Reconstruction (due to have been released in September 1990) and 1492: A Meeting of Cultures (due in the spring of 1991).

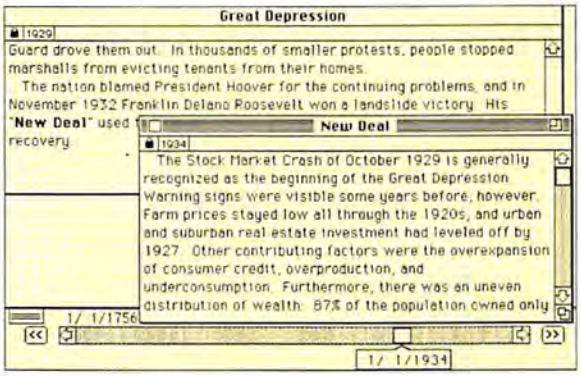


Point of View lets you view historical data in a variety of ways simultaneously. Here, for example, you can see three views of 1968: the key events, a map of the population between the ages of 25 and 44 in the western states, and a chart of federal spending on public welfare for the year.

Historical Problems. The package has a few shortcomings. There is an annoying and distracting flicker during transitions between screens, when windows are resized and moved around. (HyperCard handles this more smoothly with its LockScreen command and visual effects.) The automatic scaling of data charts sometimes creates y-axis labels that are hard to understand, because they are not round numbers. Many scanned graphics are poorly cropped and centered (for example, the top of Robert E. Lee's head is lopped off, something only the most rabid Yankee might have desired). There are more typographical errors than any carefully edited educational package should have.

got it made in the shades.

*Suggested U.S. list price. © 1990 Hewlett-Packard Company PE12041



Point of View provides true hypertext capability: Clicking on a boldface word or phrase (in this case *"New Deal"*) brings up an additional window of data.

Scholastic might have simplified installation (and saved the cost of so many disks) by licensing StuffIt or a similar utility to compress and unpack the huge data files — more than 5.2 megabytes' worth. Ultimately, the best medium for such large productions will be CD-ROM.

Although the manual contains a list, none of the hundreds of documents include complete source citations — students may not care, but for teachers and historians, this omission is unforgivable. For famous documents such as the Declaration of Independence or the Gettysburg Address, the original manuscripts are well known, but I would like to know the sources for other items.

The Bottom Line. Despite these quibbles, Point of View belongs in the software library of any high school fortunate enough to own a Mac and is a must for developers exploring alternative authoring environments to HyperCard. In fact, because you can edit and create your own data files, daring users might take Point of View in a totally different direction. Imagine, for example, being able to scan regional sales data over time simply by sliding the time line back and forth. Suddenly, history doesn't have to mean textbooks anymore. Point of View turns the task of learning history — either past or recent — into an exciting exploration instead of a chore.

— Mike Markowitz

Get Info

Point of View
$$$$$
Published by: Scholastic Software, 730 Broadway, New York, NY 10003; (800) 541-5513 or (212) 505-3000.
Version: 1.0.
List Price: $199.95.

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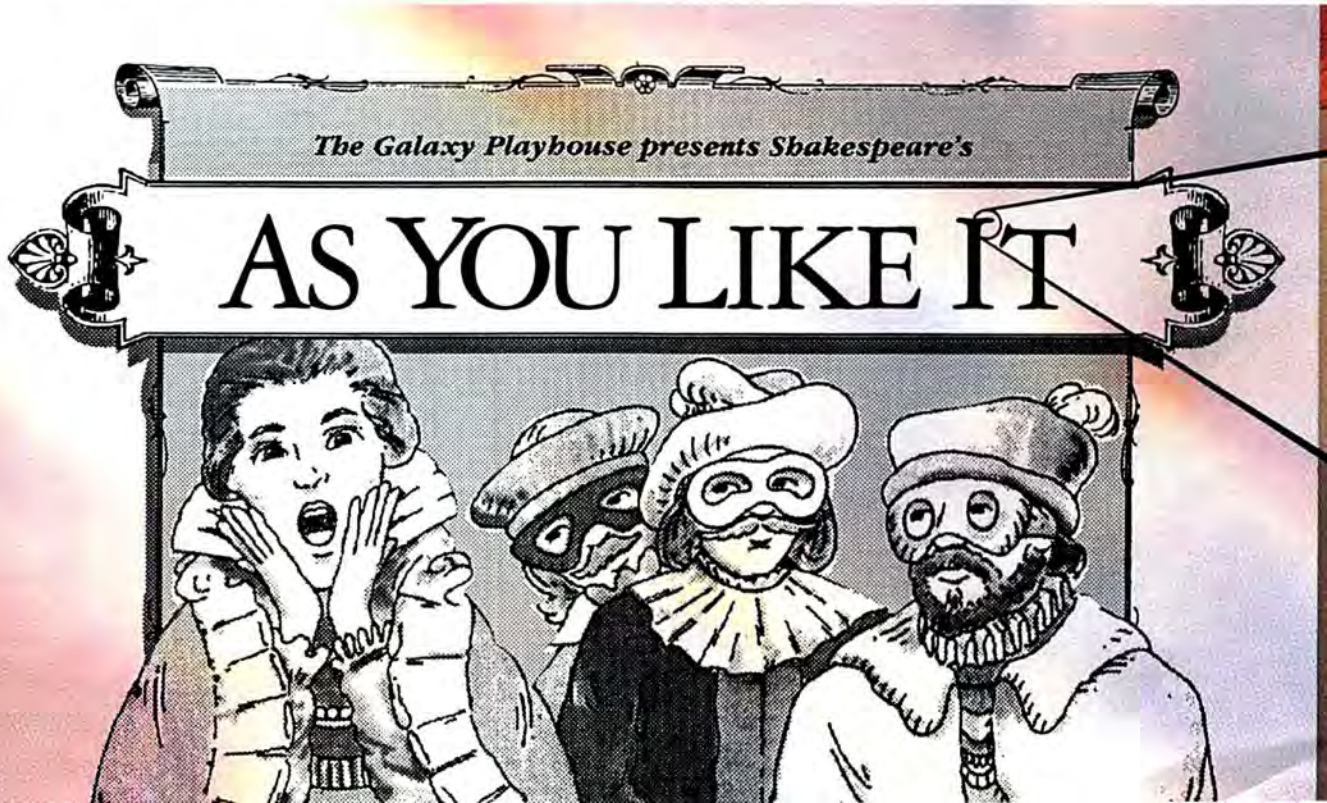

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*Serif depicted conceptually, represents the benefit of variable dot sizes.
†Suggested U.S. list price for full Macintosh configurations including minimum required memory.
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INPUT DEVICES

Switchboard

Click, snap, presto, change-o! DataDesk introduces the first customizable keyboard.

DataDesk's Switchboard is the first modular, customizable keyboard for the Mac. Its major components can be rearranged, and connectors for machines other than the Mac are already installed.

The most rigid part of every Mac is the keyboard — just ask any lefty who ever wanted to use the keypad or cursor keys. DataDesk's Switchboard changes all that, because it's the first modular, customizable keyboard.

The Switchboard comes with three standard modules — a cursor keypad, a numeric keypad, and a QWERTY alphanumeric keyboard module (a Dvorak module is planned) — and DataDesk plans to offer more, optional, modules. The keyboard I tested came with an optional trackball, dubbed the Switchball. The Switchball has two buttons on either side of the ball that click and lock — this lets you select and drag objects without holding down a button. The third button acts just like as a normal mouse button. You can also have a mouse plugged in simultaneously.

When pressed, our test model's keys made an audible click, reminiscent of IBM keyboards. DataDesk plans to offer a silent version. The Switchboard's key travel felt comfortable to the touch, and the action was smooth. The cursor keys on the trackball, unfortunately, are not in the same configuration as on the cursor pad.

The Switchboard can be configured through DIP-switch settings to run on Mac and PC platforms. IBM 3270 users

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There is a better way.

HEWLETT PACKARD

can buy an optional 24-key 3270 module. The Switchboard also lets Mac Plus owners use the Escape key and function keys without a special INIT installed in their System Folder.

A set of DIP switches located under the snap-on cover lets you customize your keyboard. IBM users can switch the Caps Lock- and Control-key placements. You can also keep the Shift key from affecting the comma and period keys, which otherwise produce the < and > characters.

Unlike its predecessor, the Mac 101, the Switchboard has ADB connectors at both ends, with the power-on switch atop the keyboard, rather than on its back edge.

The Bottom Line. If you're looking for an alternative to Apple's extended keyboard, look no further than DataDesk's Switchboard. With all the options available and with DataDesk promising more in the future, you can feel safe knowing that you'll be able to customize the Switchboard to suit your changing needs.

DataDesk was one of the first companies to produce an extended keyboard for the Mac, and over the years, its keyboards have consistently been the best. DataDesk deserves credit for introducing a product that's significantly different. The Switchboard costs $10 more than Apple's extended model, but in exchange for the slightly higher price, you get a keyboard that conforms to your needs, not the computer's. And that's what *personal* computing is all about.

— Andrew Eisner

Get Info

Switchboard
★★★★★
Manufactured by: DataDesk International, 9314 Eton Ave., Chatsworth, CA 91311; (800) 826-5398 or (800) 592-9602 (in CA).
List Price: $239.95.

BetaWatch

Products on the Horizon

Adobe Illustrator 3.0 is a major overhaul that boasts improved text handling, graphing and charting tools, and an improved interface. The text-handling enhancements include an unlimited number of characters, styles, sizes, and colors in a text block; text on a curve; the ability to convert PostScript fonts into editable outlines; text flow from one column to another or any other shape; automatic text wrap around an object; the ability to rotate, skew, and scale any text block while still retaining full text editability; and text importation from most popular word processors. The graph tool creates charts and graphs from live data in the program's own spreadsheet. The spreadsheet, however, isn't intended for computationally intensive work. Instead, you still do the number crunching in a program such as Excel and then paste the numbers into Illustrator. The graph tool then lets you create objects you can use as

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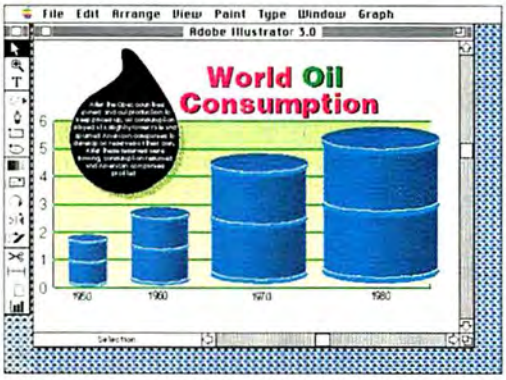
units, so you can create your own *USA Today*-like charts and graphs. Adobe will also include Adobe Type Manager 2.0 and Adobe Separator.

Adobe Systems, 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94039; (415) 961-4400. $595; upgrade, $99 for registered owners until December 31, 1990, and $149 thereafter.
ETA: September 1990.

Typist is Caere's latest entry in OCR hardware. A custom-designed hand-held scanner, Typist boasts a 5-inch-wide scan path, 2-inch-per-second scan rate, automatic stitching (text only), 300-dpi resolution, horizontal or vertical scanning, automatic contrast setting, and direct input into any application. Caere's software lets you insert recognized material into any application without launching a separate OCR program, so, for example, you can scan part of your accounts ledger directly into the spreadsheet you're currently working on without launching a separate OCR application such as OmniPage. Typist's yaw control prevents the unit from slipping offline and distorting the scan.

Caere, 100 Cooper Court, Los Gatos, CA 95030; (408) 395-7000. $695.
ETA: October 1990.



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MULTIMEDIA

The Magic Flute Audio Notes and The Voyager CD AudioStack

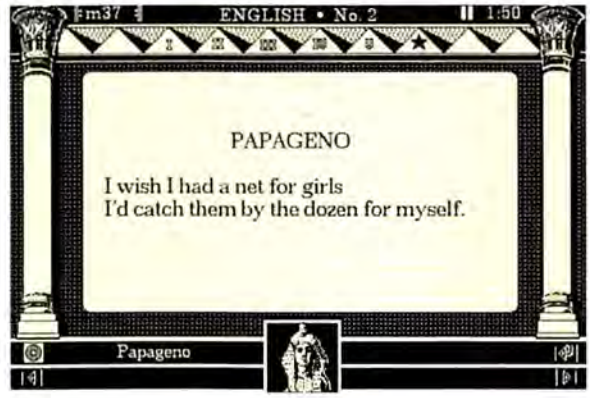
A finished project and a versatile tool kit let you explore your favorite music with your CD-ROM drive.

It's been a long wait. Ever since Apple set the Mac standard by including full CD-audio capability in its CD-ROM drive, we've been waiting for software that would take full advantage of the hardware. And now it looks as though the wait may finally be over. Warner New Media and Voyager have combined HyperCard and CD audio to create a music-appreciation laboratory.

The Magic Flute Audio Notes. Warner New Media's The Magic Flute Audio Notes is ambitious, if nothing else—explaining Mozart's final opera with a HyperCard stack is no easy task. Given that the opera is a complex masterpiece, it's remarkable that the Audio Notes materials actually do it justice.

The Magic Flute Audio Notes offers four primary options for real-time listening to Nicholas Harnoncourt's recording: an English libretto, the original German libretto (the opera is sung in German), a synopsis of the on-stage action, and a running musicological commentary.

In addition, numerous "sidebars" provide ancillary information on everything from original cast members to musicological terminology. Some of the sidebars include audio narration on topics such as fugue, modulation, the opera's original playbill, and Mozart's death. A hilarious excerpt of Florence Foster Jenkins' notorious rendition of the Queen of the Night's aria shows how opera *shouldn't* be sung, and there's an excerpt from *The*



Warner New Media's The Magic Flute Audio Notes gives you an annotated version of Mozart's last opera. You can follow along with an English or German libretto or skip to one of the other primary stacks, using the Roman numerals at the top of the screen. It's not intuitive, but it works.

The Voyager CD AudioStack is a HyperCard tool kit for creating your own interactive CD-audio guides. The EventMaker is one of the main tools. Once you've identified a particular passage of CD audio, you can automatically create a button that plays it from your stack.

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Music Man that illustrates a patter song.

At times, all this information gives the package an everything-but-the-kitchen-sink flavor. Users with a MIDI setup can play MIDI examples from the score. And users with a CD+Graphics-equipped compact-disc player can listen to the opera and read the accompanying text on a monitor.

Warner New Media's goal is to deliver a lot of value for the money. Although the $60 street price of this version of The Magic Flute is about a third more than a normal CD recording of the opera, it's definitely impressive when the whole thing works. The graphics are attractive; the information is interesting; and the interface is serviceable, although it could be more intuitive.

The shortcomings are not in the program but in the installation instructions and documentation. The installation process is inelegant and insufficiently documented. To begin with, the opera is divided onto three CD-ROM discs, each of which has a set of controlling HyperCard stacks. If your Mac has the requisite 13 megabytes, you can install all the stacks on your hard-disk drive. After you use the automatic installation process on the first disc, however, it starts playing without giving you the option of immediately installing the next disc. Beginners to the CD-ROM/HyperCard scene will waste considerable time before they figure out how to exit gracefully from the first disc — a procedure not immediately evident.

Another minor irritation is that you must use a custom Home card whenever you run the program, which means you have to give your regular Home card a different name for the whole time you're running the program.

No information is provided that details the package's compatibilities or known incompatibilities with different CD-ROM players. I had some trouble getting the right combination of CD-ROM drivers to let me run The Magic Flute on a Toshiba XL-3210 drive, although once I'd obtained up-to-date drivers, everything worked fine.

Warner New Media plans to address all these problems in its second release, which will be the Beethoven String Quartet No. 14 in C, op. 131.

Overall, The Magic Flute Audio Notes is a good value for CD-ROM-drive owners who are interested in learning more about this opera. For music educators, its appeal is more than obvious.

The Voyager CD Audiostack. Warner New Media's Magic Flute stack is protected; you can't study its scripts to see how it was done. The Voyager Company, on the other hand, left the secrets of its earlier Beethoven's Ninth Symphony CD Companion Series stack (see "CD-ROM Hit Parade," April '90, page 167) out for all to see. Voyager has now gone one step further and released the tool kit that it used to develop the Beethoven project (and the upcoming The Rite of Spring by Stravinsky).

The Voyager CD AudioStack gives you a set of scripts, buttons, and suggestions that let you use HyperCard to precisely control a compact disc (in a CD-ROM player). The hard stuff is done with XCMDs that you can install either in a specific stack or in your Home stack.

If you knew enough about Beethoven, you could create your own version of Voyager's project, or you could do something similar for "Strawberry Fields Forever." The scripts are thoroughly and clearly commented, and anyone with a smattering of HyperTalk proficiency should find it easy to modify them.

The Bottom Line. Both Warner New Media and Voyager are still pioneering this technology. But even as initial projects, these are good efforts, well worth investigating. Until we start seeing a greater number of quality CD-ROM titles, we might best utilize our CD-ROM drives by having them help us learn more about music that we tend to take for granted.

— James Bradbury

Get Info

The Magic Flute Audio Notes

♯♯♯♯

Published by: Warner New Media, 3500 W. Olive Ave., Burbank, CA 91505; (818) 955-9999.

List Price: $66.

The Voyager CD AudioStack

♯♯♯♯♯

Published by: The Voyager Company, 1351 Pacific Coast Highway, Santa Monica, CA 90401; (213) 451-1383.

List Price: $99.95.

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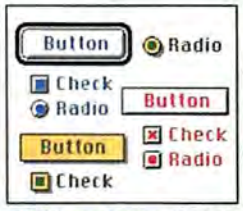

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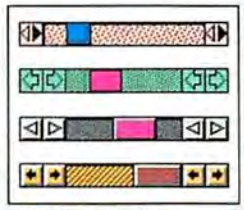

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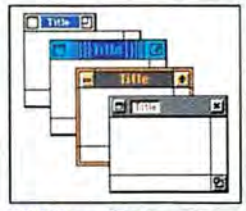

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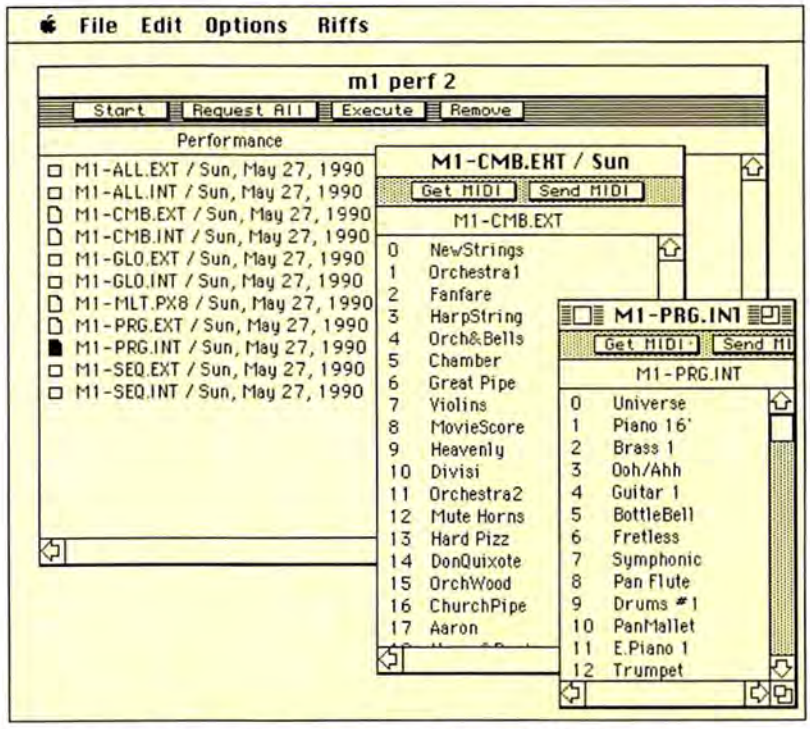
MUSIC

Super Librarian and Galaxy

For overpatched musicians, a universal patch librarian may be the perfect panacea.

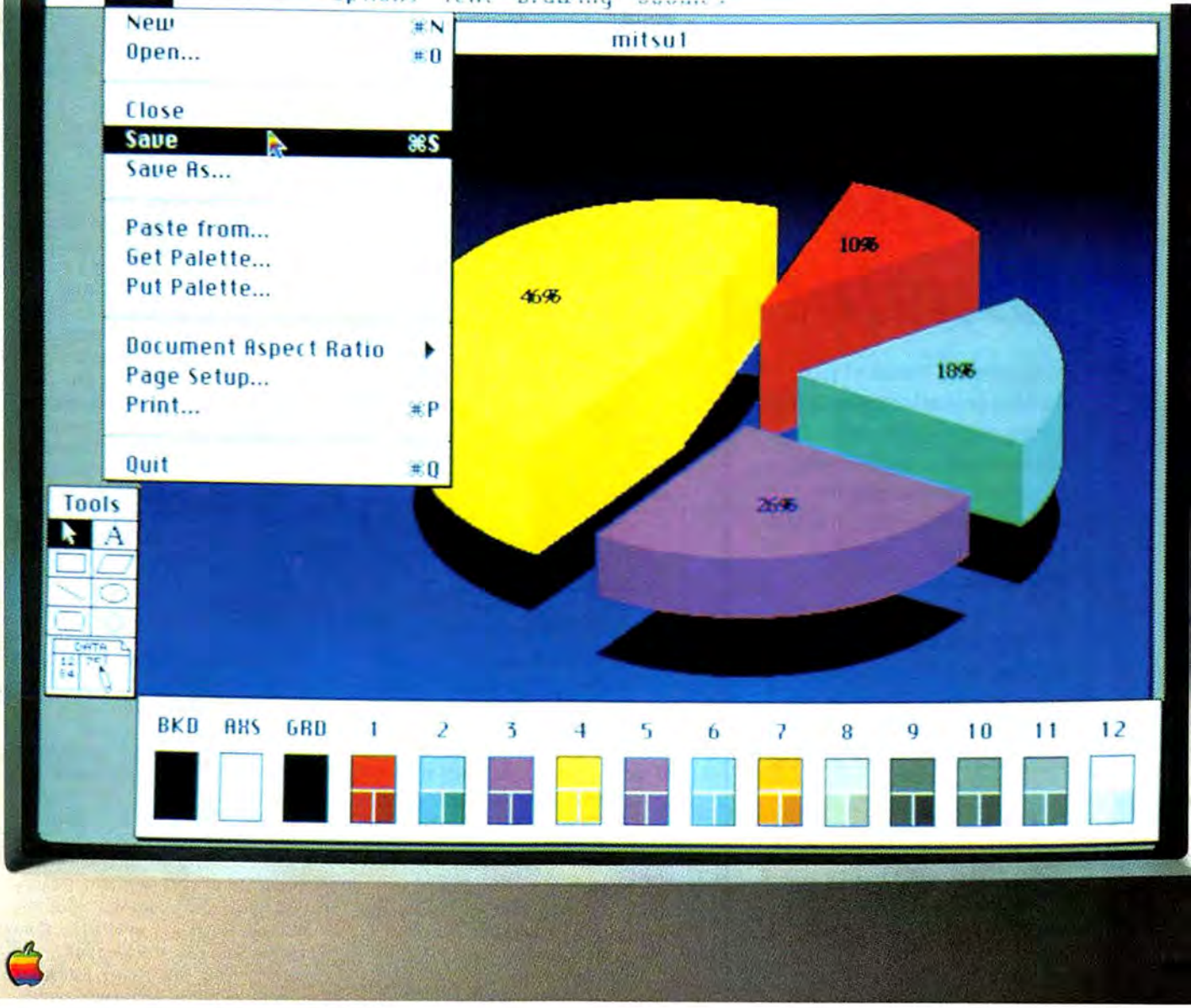


Super Librarian is a multiplatform universal patch librarian for MIDI synthesizers that organizes groups of instruments or different banks of a single instrument into a *performance*. Buttons for sending and receiving patch information are located inside each Device Folder rather than on a menu.

With the advent of synthesized music and MIDI, consumers have been exposed to an ever-expanding market of musical instruments and peripheral devices. Up to this point, organizing patches for each of your instruments has been an elaborate and expensive chore. If you were unlucky enough to be without a computer, instrument manufacturers were only too happy to sell you overpriced and instrument-specific RAM cards. Even with a computer, you needed separate librarian programs for each synthesizer and effect box. Finally, a more sensible day has dawned: The universal librarian program has been born!

Two such programs are now available for the Mac: Super Librarian, from Pixel Publishing, and Galaxy, from Opcode Systems. The programs are similar in their ability to perform the basic functions of patch-librarian work. Each operates with instruments from the major music manufacturers (Roland, Yamaha, Korg, Kawai, et al.), can save and load entire instrument setups with the help of an external MIDI patchbay, print lists of selected patch banks, store short sequences for testing sounds, and provide a way to communicate with machines not specifically supported by the software.

Super Librarian. Super Librarian opens with the Setup Window, where MIDI channels and patchbay numbers are assigned, serial ports designated, and Device Folders installed. Double-clicking on a Device Folder reveals the data files in that folder. These files contain



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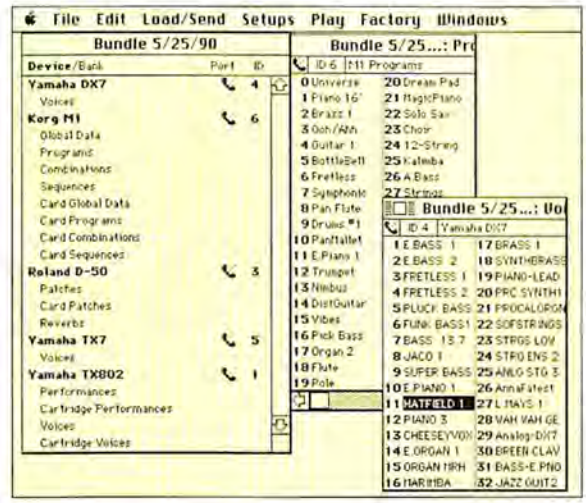

Galaxy is Opcode's universal patch librarian and a good companion to the company's sequencer, Vision. By organizing your instruments in a bundle, you can load an entire Galaxy setup with one command. You can audition and organize individual patches from a bundle or by using separate patch banks.

patch information for specific instruments and their banks (for example, Korg M1 internal programs). You can move patches individually from one bank to another or shift them within a single bank. You send and receive patches via MIDI from the buttons in the Bulk Organizer, which contains the patch names, or from within the Device Folder. Memos containing more information can be attached to each patch bank.

Super Librarian was written for the Mac, IBM PC, Atari ST, and Yamaha C1, which is the real advantage of the product. Not every musician's or studio's computer is a Mac, and having to lug your synths around simply to share the latest Proteus library with an ill-informed colleague is a pain. Super Librarian allows the transfer of patches from one type of computer to another as long as the same *profile* (a set of instructions that control data transfers) is loaded in each machine. True, you have to lug your Mac and your partner needs to own the program, but we should be thankful whenever data can be moved directly from one computer format to another.

The bane of this multiformat approach is that the application wasn't written specifically for the Mac. Initially I was unable to use certain sections of the program, because it wasn't compatible with a IIcx (although, once I'd informed the company, it fixed the problem immediately). The interface tries to be Mac-like but fails in some obvious ways. Double-click on a specific patch-bank document in the Finder, and you're told to start the program first. Close a window without making any changes, and the program asks you if you want to save. Controls are buried in folders, when they could be on a menu. These are simple things, but simple things that experienced Mac users have come to expect.

Galaxy. In all things, experience counts. Take Opcode, for instance. It's been putting out some of the best Mac librarian programs for years, and its expertise is apparent in Galaxy.

If you've ever used another Opcode librarian or editor/librarian, Galaxy should look very familiar. For the uninitiated, Galaxy opens with a Configuration dialog box in which you install instruments. As with Super Librarian, you install only the instruments you're actually going to use. Once they're installed, you operate as with any other Opcode librarian.

Patches are organized in banks, bundles (as parameters of a single instrument, such as Korg M1 internal and external programs and combinations, or as groups of different instruments, such as M1, DX7, and Kawai K4), and libraries (alphabetical listings of all installed patches by instrument type). You can audition sounds from your master keyboard or the Mac keyboard or by pointing and clicking on the graphic MouseKeys display.

Another Opcode feature included in Galaxy is Patch Factory. Those of you with too many patches and no time to search for inspiration can create banks that contain a random selection from your master library. A function called Shuffler brings you a bank of random sounds created by the jumbling of individual patch parameters. Some truly ugly sounds can result, but on occasion something worthwhile emerges. Another option, Shade Two, gives you a bank of patches

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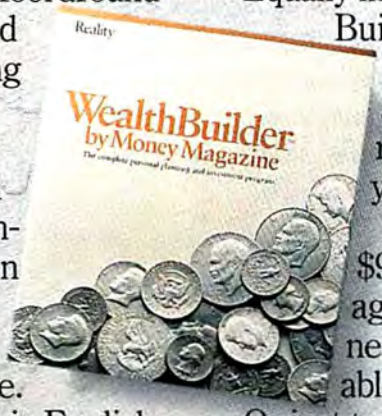

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Reality TECHNOLOGIES

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that change incrementally between two different sounds.

Galaxy also shines in its relation to Vision. Opcode's professional sequencing program (see review, December '89, page 82). Through processes known as "publishing" and "subscribing," Galaxy sends all patch names for a selected bundle to Vision. Any later changes you make to a Galaxy bundle are automatically updated in the other program as well. Prior to this, musicians had to view patch identities by their location (internal bank A, number 27) rather than by name (trumpet), which is tough on the memory bone in a multidevice setup. Other sequencer programs now let you enter patches by name, but you have to type each name individually.

The Bottom Line. Both Super Librarian and Galaxy provide a way to address MIDI devices not specifically supported by the programs. By using System Exclusive information supplied in a device's manual, you can write new instrument profiles for each program. You write Super Librarian profiles with its MIDI Operating System language, a series of numbers pulled from the hexadecimal MIDI code. Opcode uses PatchTalk, a language that is based on HyperTalk. For musicians without some prior experience with hex code and System Exclusive, both systems will seem incomprehensible.

A final consideration that differentiates the two programs is philosophical. Galaxy uses Opcode's copy-protection scheme, allowing two hard-disk installs, whereas Super Librarian is not copy-protected. Pixel Publishing argues that people will be motivated to buy rather than copy its program in order to receive updates and gain access to the Super Librarian BBS, where additional profiles are available.

Galaxy is clearly the better program, with its extra features, ease of operation, and connection to Vision. Although not as elegant, Super Librarian is a reasonable alternative for Mac musicians who, however reluctantly, deal with non-Macintosh studios.

— Christopher Breen

Get Info

Galaxy ★★★★½
Published by: Opcode Systems, 3641 Haven Drive, Suite A, Menlo Park, CA 94025; (415) 369-8131.
Version: 1.0.
List Price: $249.

Super Librarian ★★★½
Published by: Pixel Publishing, 1573 Eglington Ave. W., Suite 3, Toronto, Ontario M6E 2G9, Canada; (416) 785-3036.
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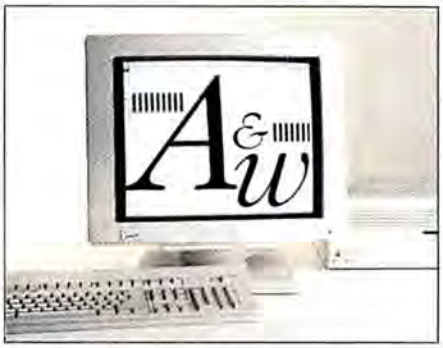

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MAXIMUM MOVABLE MEGABYTES: ERASABLE OPTICAL DRIVES

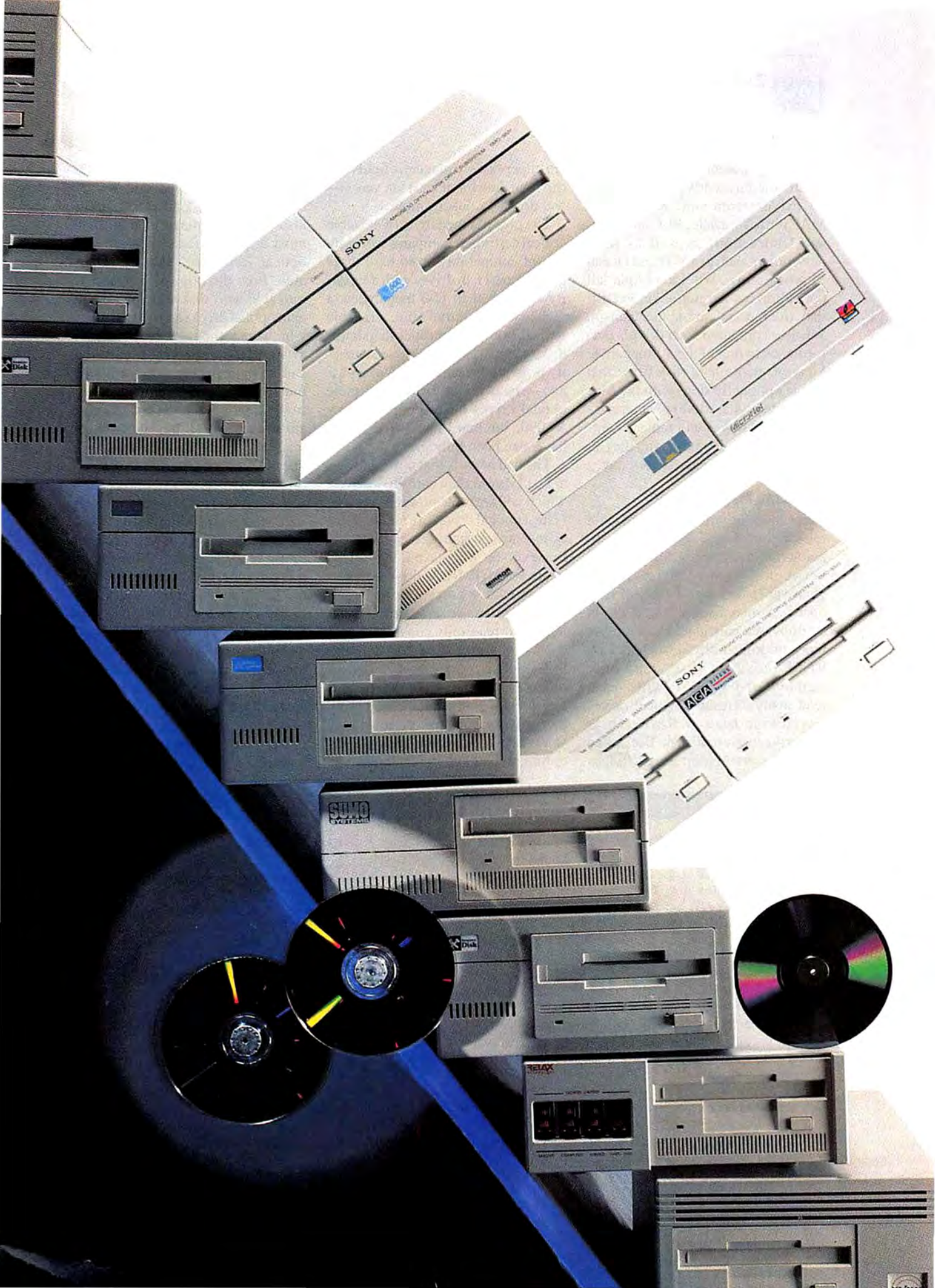
Big data-storage problems? One of these 20 erasable optical drives could be the solution.

BY JOHN RIZZO AND THE MACUSER LABS STAFF

Keeping up with new technology is never as easy as keeping up with the Joneses. When all the hype is said and done — and after you've spent your money — today's hot product may end up being tomorrow's cold fish. With prices continually dropping and performance steadily increasing, the Eternal Question remains: Is *now* the time to buy?

A year ago, we looked at the erasable optical drive, a promising new system for data storage (see "Letting in the Light," November '89, page 132). Since then, a dozen new drives have appeared and major improvements have been made in the supporting technology. So it seems logical to ask once again: Is now the time to buy an erasable optical drive? The answer is a definite "maybe." In addition to being faster and less expensive than they were a year ago, erasable optical drives have become much more compatible among vendors, offer improved software, and can now be used as your Mac's startup drive.

PHOTOGRAPHY: FRED STIMSON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Erasable Optical Drives

To help potential buyers decide whether to buy a drive now, we tested drives from optical veterans MACsetra, Pinnacle, PLI, and Storage Dimensions, as well as from newcomers such as FWB and Ocean Microsystems. We found that all optical drives are not alike, even if they use the same basic mechanism. We also compared each drive's performance to that of the 40-megabyte Sony magnetic hard-disk drive that Apple optionally ships with the Mac IIcx. Although it's unlikely that erasable optical drives will replace hard-disk drives any time soon, they're looking more attractive every day.

Massive Mass Storage

For those of you who blinked and missed the advent of this new technology, an erasable optical drive holds between 600 megabytes and a gigabyte (1,000 megabytes) of data on a 5.25-inch disc contained within a removable cartridge. Unlike other types of optical drives, such as CD-ROM (compact disc, read-only memory) and WORM (write once, read many), erasable optical drives let you write data as well as read it, as with a magnetic hard disk. But unlike hard disks, erasable optical cartridges are impervious to magnetic fields and can hold data for at least ten years — and probably dozens more.

The cost per megabyte of erasable optical cartridges compares well with that of comparably sized hard disks (see Figure 1). In drives with a capacity of more than 600 megabytes, a megabyte of removable, erasable optical storage is cheaper than hard-disk storage. This break-even capacity is about the same as it was a year ago — retail prices for some erasable optical drives have dropped below $4,000, but hard-disk-drive prices have also been falling.

The bad news is that optical drives are still slower than hard-disk drives, which will frustrate power users. The fastest optical drives are about as fast as the slowest hard drives. Even so, those of you who have fallen asleep while your CD-ROM drive accesses data shouldn't worry: Erasable optical drives are several times faster than their read-only cousins.

Nevertheless, slow performance has limited most erasable optical drives to the role of secondary storage devices, with which speed is not the primary concern. A secondary storage device can be a network server or a second volume in addition to a hard disk that holds the System Folder, applications, and backup copies of data. Secondary-storage use also takes advantage of one of the most attractive features of erasable optical cartridges: They're removable. Like the popular SyQuest removable-hard-disk systems, an erasable optical drive can fill a cartridge, which can then be removed and swapped for a new, blank cartridge. But an optical cartridge can hold as much as 25 SyQuest cartridges can. In addition, erasable optical cartridges are immune to all but the strongest magnetic fields — even those produced by the electromagnets that pick up old BMWs in auto-wrecking yards.

With software advances, increasing speed, and now the ability to boot up as startup drives, it's now feasible to use erasable optical drives as primary storage. For example, we tested a PLI Infinity Optical (one of the fastest drives tested) as a hard-disk substitute. On a day-to-day basis, it was quite satisfactory for most casual office tasks such as word processing, electronic mail, and even light spreadsheet use. Its slowness became noticeable, however, with use of power-hungry software such as database or 3-D-graphics programs.

WORM

Before erasable optical drives appeared, there was WORM, an optical drive technology named for its write-once, read-many limitation. Because you can't erase anything, WORM drives have a limited but unique reason for being: They're the ultimate archiving medium.

WORM drives write data by burning holes into the surface of a special type of disc; because the holes are physically burned into the disc, the data they represent can't be altered. The discs last for decades, long after modern paper crumbles to dust. This indelible record, an electronic paper trail, is highly desirable in government; finance; law; medicine; and any other field that requires permanent, unalterable storage of important documents.

An additional useful aspect of WORM drives is their ability to create *histories*: You can "delete" a file from the desktop in the usual way — by dragging it into the Trash — but the file actually remains on the disc, whole and intact. It's just that a new Desktop file has been created that ignores the deleted file. Because everything you've ever written is still on the disc (including every previous version of the Desktop file), you can access your disc's entire history if you have the appropriate software. The Access 650 drive from Laser Magnetic Storage International of Colorado Springs, Colorado, comes with a DA that lets you "restore" a WORM-disc directory to its condition on any past date.

WORM technology is here to stay, but WORM-only drives may soon be replaced by hybrid *multifunction* drives that can write to and read WORM as well as erasable cartridges. Several OEM vendors have announced multifunction drives this year, and a few of these drives will soon be available for Macs (see the "On the Horizon" sidebar).

A new type of WORM technology burns holes into the surface of tape instead of into a disc. LaserTape Systems of Campbell, California, is working on such a system, which it calls digital optical tape, or DOT (we're glad LaserTape didn't end up calling it Tape WORM). A $250 DOT cartridge holds 50 gigabytes, the equivalent of 23,000 copies of *War and Peace*. Only 190 of these cartridges could contain the entire Library of Congress — that's one "LOC," a new measure of mass data storage that may soon join such gargantuan units as *gigabyte* (1,000 megabytes) and *terabyte* (1,000,000 megabytes). If this is somewhat more storage than you need, consider that a 1-gigabyte DOT cartridge could cost as little as $5, which is half a cent per megabyte.

Figure 1: Megabytes per Buck

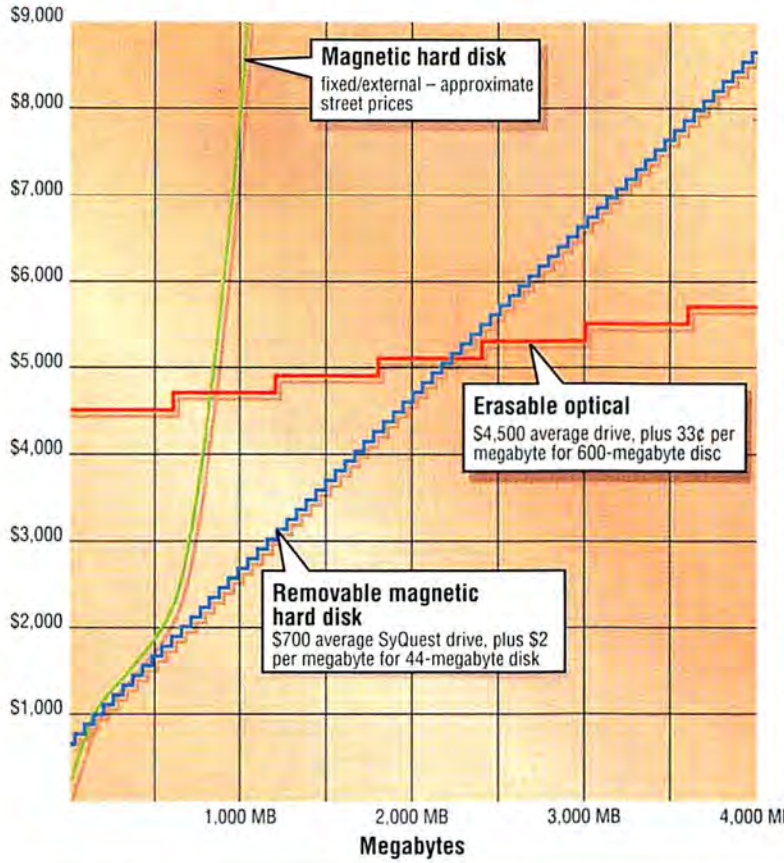


Figure 1: At about 650 megabytes — the size of an average optical disc — the cost per megabyte of erasable optical storage is less than that of storage on a magnetic hard drive. Erasable optical drives become much more cost-effective as storage needs increase and the cost of hard-disk drives skyrockets. At slightly over 2 gigabytes, erasable-optical technology beats even inexpensive removable SyQuest hard-disk drives — and at that point, you'd need 50 SyQuest cartridges to equal 2 to 3 optical cartridges. Chart lines plotted for erasable optical and SyQuest cartridges are stepped to indicate their relative capacity.

Still, it is not casual office workers, but users with specialized tasks, who can really take advantage of erasable optical drives. In electronic document processing, for example, where scans of handwritten documents are stored for retrieval and on-screen processing, optical cartridges can act as a replacement for microfiche. And because they can be accessed over a network, *jukeboxes* containing many erasable optical cartridges make excellent general-purpose file servers.

Erasable optical is also attractive to electronic-prepress professionals who generate multimegabyte color-graphics files and have outgrown magnetic removable cartridges. Although most desktop-publishing service bureaus don't yet support erasable optical cartridges, you can always lend them your erasable optical drive when necessary.

If you create or use multimedia presentations, the erasable optical medium offers you the advantages of portability, data security, and enormous storage capacity. Multimedia projects tend to be big: When they involve animation and sound, it's not unusual for them to gobble up a few hundred megabytes. An optical cartridge can easily carry such a presentation, whereas a 44-megabyte SyQuest cartridge would definitely be overwhelmed.

Erasable optical drives are also appearing in industries that deal with huge individual files that must be stored on removable cartridges. Audio engineers can use an erasable optical drive to store digitized sound, as long as the drive they choose is fast enough. Scientists and engineers can use erasable optical drives for data-acquisition applications — in fact, if you need to collect and store hundreds of megabytes of data in a single data-input session, erasable optical is the *only* solution.

Deeds and Speeds

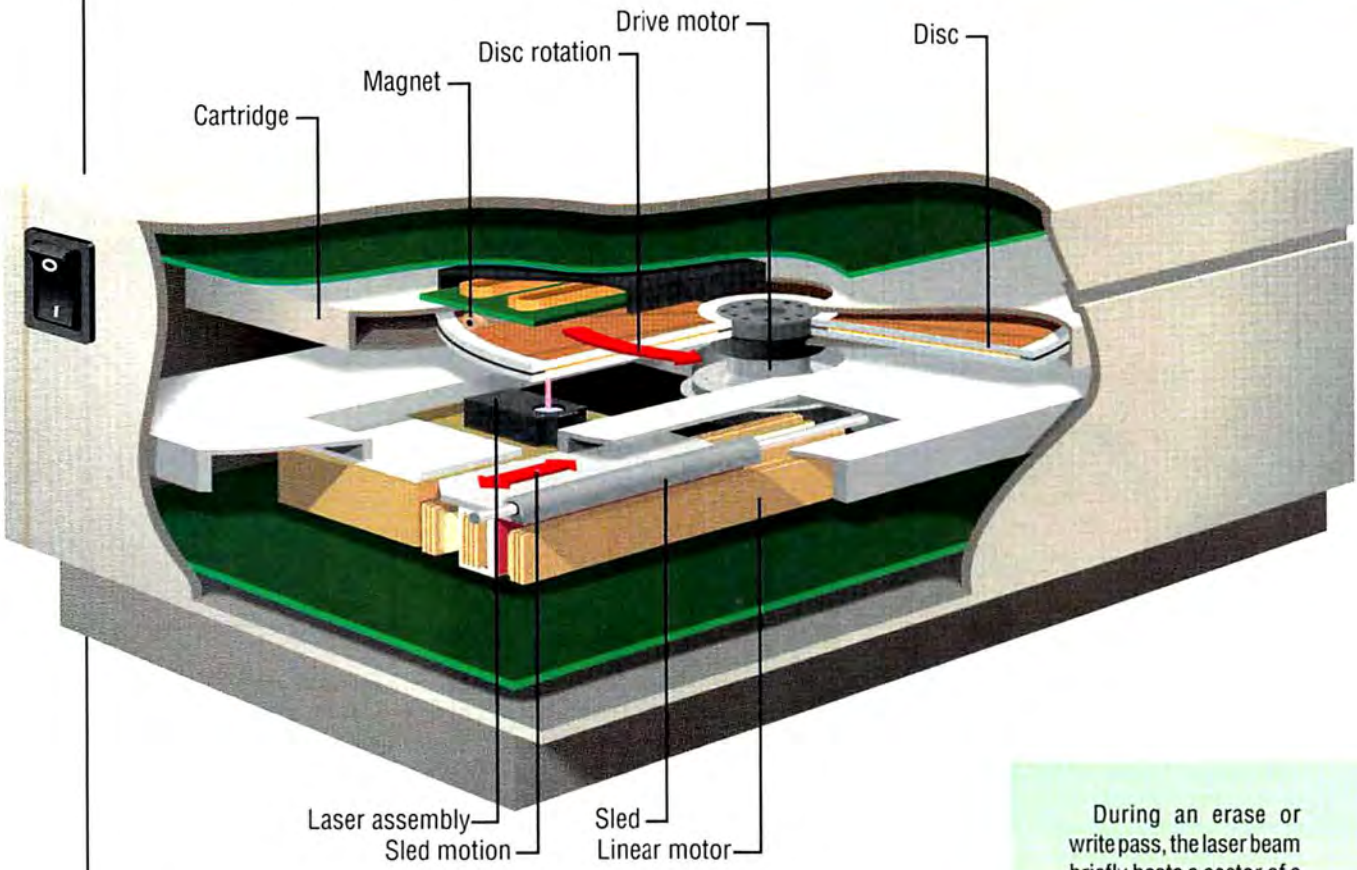
Any experienced Mac user will have no problem setting up and using an erasable optical drive. All are plug-and-play SCSI drives that follow the familiar rules for SCSI-ID numbers and the termination methods for connecting hard-disk drives (see "101 Hard Drives," February '90, page 153).

Likewise, if you know how to use a standard Mac floppy-disk drive, you know how to use an erasable optical drive. Like a floppy-disk drive, most erasable optical drives eject the optical cartridge when you drag its icon into the Trash — the FWB drives require you to push an Eject button.

Erasable Optical Drives

How It Works

Today's erasable optical drives use a technology called *magneto-optical* (MO), which uses a laser beam to write data onto and read it from a plastic disc. On the disc is a layer of a special material that, when heated, retains the magnetic polarity of a nearby magnet.



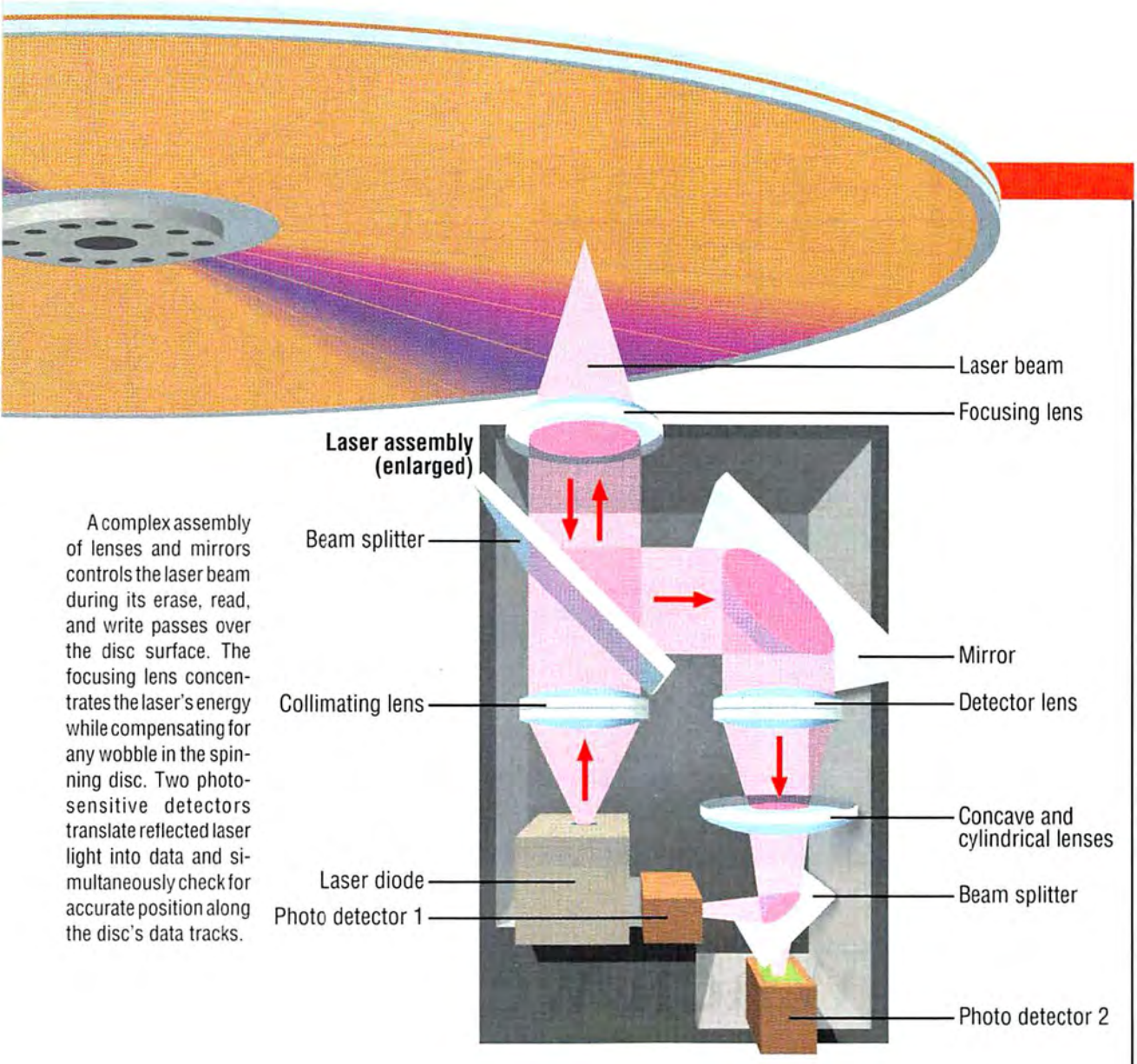
To write on the disc, a laser beam heats a spot on the material while the magnet is turned on in one of two polarities. Since the magnetic polarity of magneto-optical material can change only when it is heated, an MO disc is almost impervious to magnetic fields — unlike a hard or floppy magnetic disk.

Instead of heat, the *rotation* of a polarized laser beam is used to read the data. The laser beam is polarized by a *beam splitter*, reflected off the disc, and measured by a detector. The laser beam rotates in one of two directions, depending on the polarity of the magnetized area of the disc.

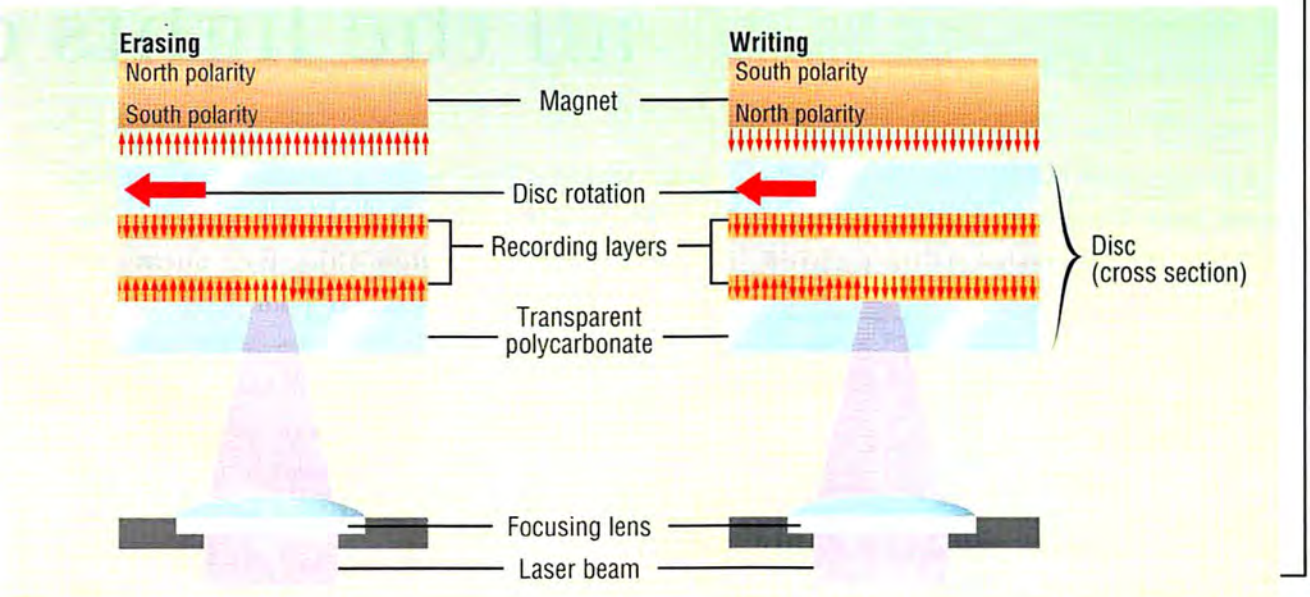
Because an erasable optical drive doesn't use a magnet to read magnetic fields, as a floppy-disk or hard-disk drive does, the optical head can be much farther away from the media than a magnetic head can. For this reason, optical discs are much less susceptible to wear, as well as to damage from dropping or shaking, than are magnetic disks.

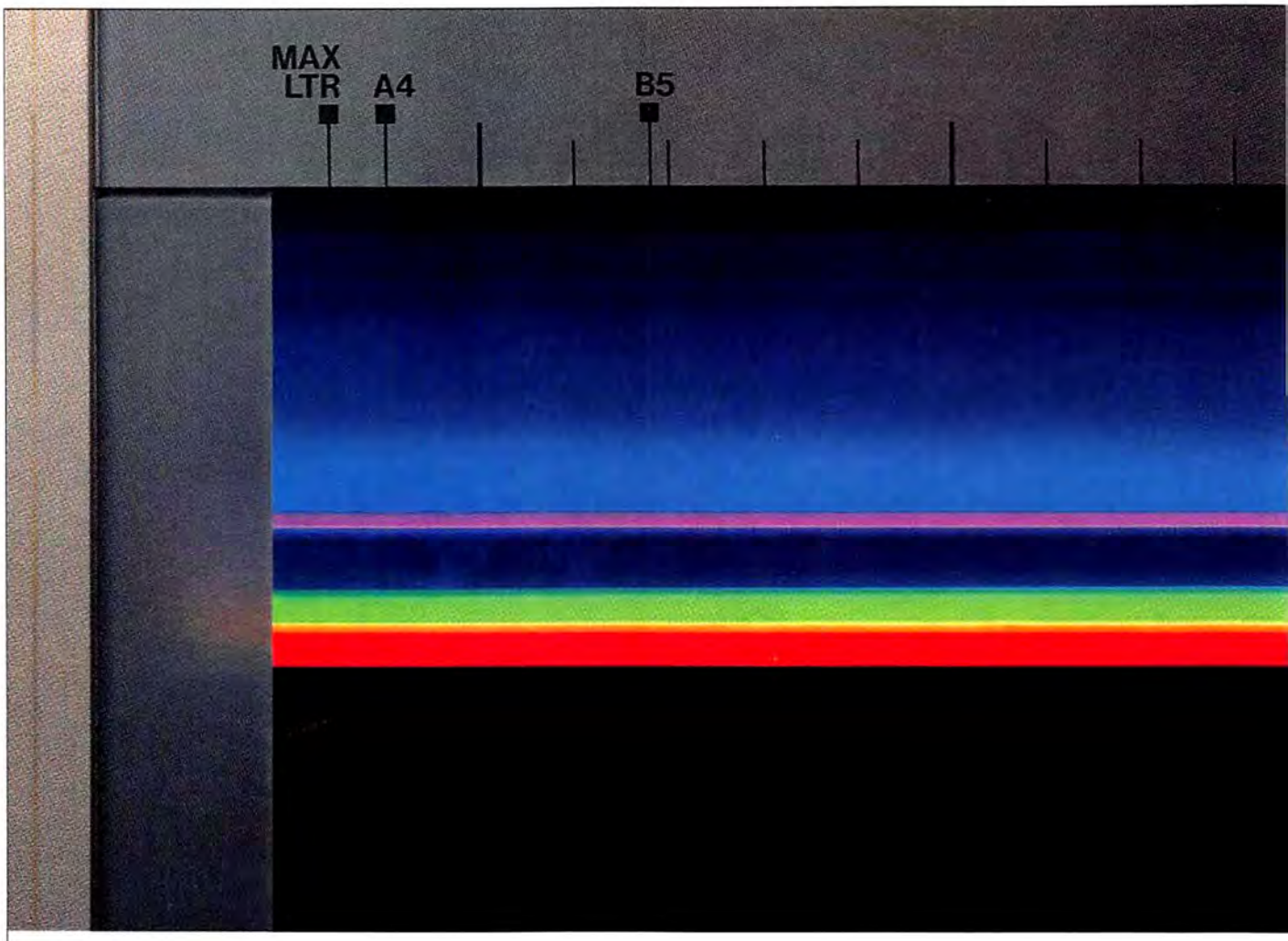
During an erase or write pass, the laser beam briefly heats a sector of a narrow track in the spinning disc's recording layer. The heated material takes on the polarity of a magnet on the opposite side of the disc. During the erase pass, the magnet changes the entire sector to a uniform polarity. During the write pass, the magnet rapidly switches polarity to record data.

ILLUSTRATION: K. DANIEL CLARK



A complex assembly of lenses and mirrors controls the laser beam during its erase, read, and write passes over the disc surface. The focusing lens concentrates the laser's energy while compensating for any wobble in the spinning disc. Two photosensitive detectors translate reflected laser light into data and simultaneously check for accurate position along the disc's data tracks.





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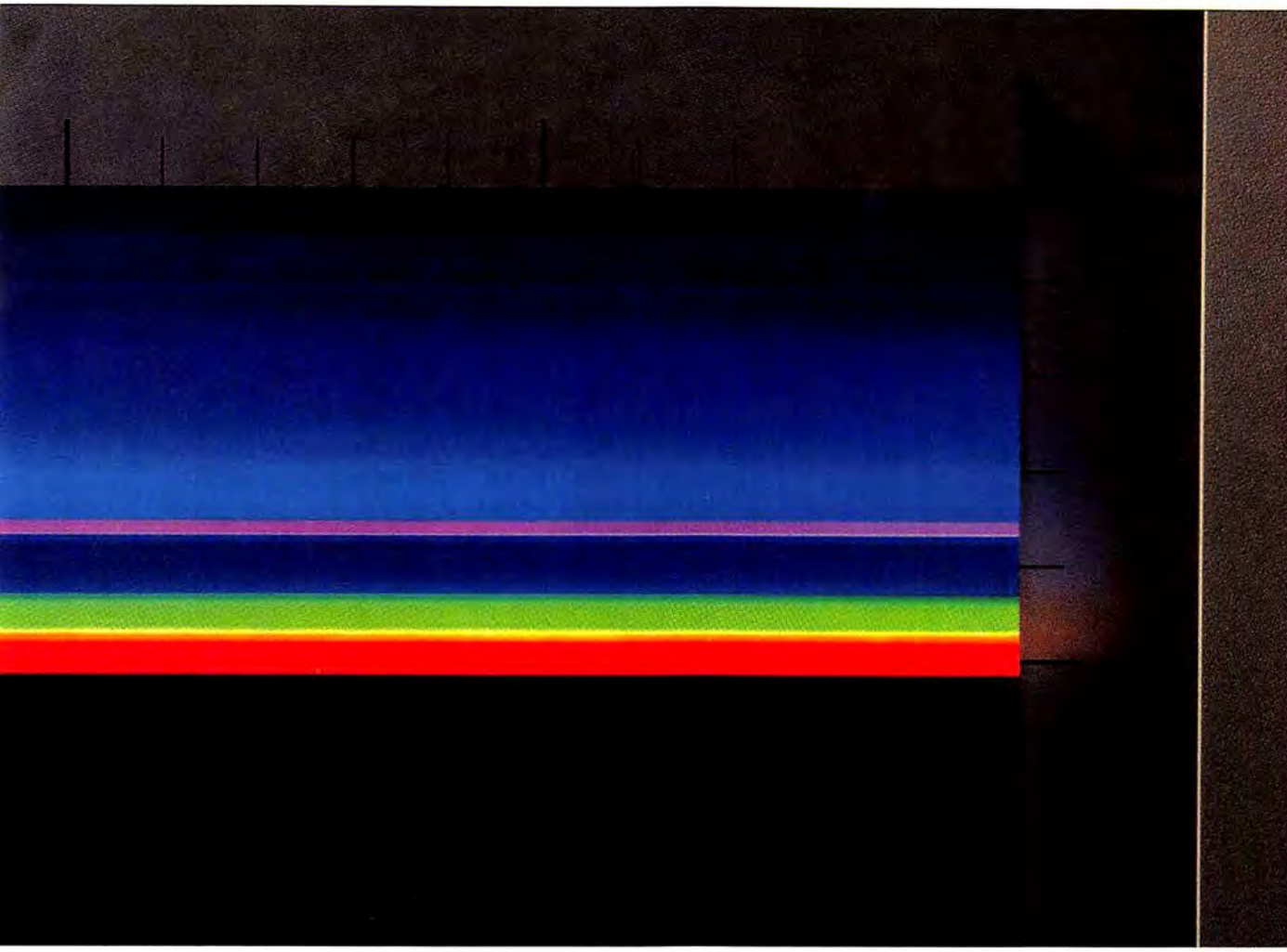

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Most drives eject the cartridge when you shut down, just as a floppy-disk drive does, but this can become tiresome if you're using your optical drive as a startup device. You'll want to keep the cartridge inside the drive when using it as a file-server volume.

Unlike floppy-disk drives, erasable optical drives can read only one side of the medium at a time: You have to flip the cartridge over to access data on the other side. Pinnacle and MicroNet get around this limitation by offering double drives (not reviewed here) that give you access to up to 650 megabytes—and MicroNet allows you to designate both drives as a single volume. In addition, the MACsetra and MicroNet units let you combine several drives on a SCSI bus into a single mounted volume. RACET offers this as an $595 option for the Cosmos SA600MO-II; SuperMac also offered such an option with the prerelease model of the LaserFrame we looked at. Buying multiple drives is an expensive solution, but it gives you access to several gigabytes at once.

To write data onto the disc, all the drives use the same magneto-optical (MO) technology, which uses laser light to read and change the magnetic properties of the medium (see the "How It Works" sidebar). There are only three OEMs (original-equipment manufacturers) of MO drives: Sony, Ricoh, and Maxtor, although new OEM suppliers are entering the market (see the "On the Horizon" sidebar). At this time, only Storage Dimensions uses Maxtor drives. Our tests show that speed varies widely, even among vendors using the same OEM drive (see Figure 3). Each manufacturer's success in developing *driver software* (the instructions for controlling the drive) determines each drive's performance.

The Maxtor (MaxOptix format) mechanism has the fastest specs, followed by Sony's and then Ricoh's. This generally held true in actual performance tests, as the fastest drives proved to be the Maxtor-based Storage Dimensions MacinStor and FWB's Sony-based version of the HammerDisk. The prerelease version of SuperMac's LaserFrame (which uses a Sony mechanism) was the only other drive in the same fast range. FWB also has a Ricoh version that is slower than its Sony-based drive, although it was still faster than several of the Sony drives we tested. Other Sony vendors also offer Ricoh mechanisms.

Benchmark Specifics

Once you get past the top two drives, the performance story becomes more complex. Some drives are better than others at certain tasks, doing well in some of our tests and poorly in others. Whereas the FWB HammerDisk 600S and Storage Dimensions MacinStor always placed either first or second, the rankings of other drives varied with the type of test.

To measure read and write transfer rates independently, we used a shareware benchmark called SCSI Evaluator (developed by William

Late Arrivals

The SuperMac LaserFrame ($6,499) and Iomega LaserSafe ($4,995) arrived too late for us to include in this report. We did test them to check their overall performance, however, and discovered that the prerelease version of the LaserFrame blazed to the top of many of our speed tests.

SuperMac came up with a way to improve SCSI performance to optimize this fast drive. The LaserFrame, which uses a modified version of the standard Sony SMO-S501 subsystem and offers a formatted capacity of 286 megabytes per side, accepts only 512-byte-sector optical discs. The SuperMac driver can create SCSI partitions that encrypt/decrypt on the fly, using true DES (Data Encryption Standard, an encryption method required by many government agencies) encoding. The driver can also mount multiple drives as one volume. Although this is an ISO-standard drive, the SuperMac high-performance driver operates only with SuperMac's mechanism; the recorded data nevertheless should be readable on any ISO-compatible optical drive. SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94086; (408) 245-2202.

The Iomega LaserSafe contains a modified Ricoh RO-5030 E2 mechanism housed in a case that can stand either horizontally or vertically. This drive accepts both 512-byte- and 1,024-byte-sector ISO-standard optical cartridges, and the drive's Finder icon tells you which one is in use. The new Iomega driver/utility software can initialize and format a cartridge in a MultiFinder background operation — a feature unique among erasable optical drives and one that can save you about 40 minutes. Iomega also includes diagnostics for testing the drive and the medium. Preliminary tests indicate that the LaserSafe's performance ranks somewhere near the average for our other drives, although it has one of the fastest Ricoh mechanisms (slightly slower than that of FWB's HammerDisk 600). Iomega Corp., 1821 W. 4000 S., Roy, UT 84067; (800) 456-5522.

— Paul R. Freedman

The Iomega LaserSafe (left) and SuperMac LaserFrame (right) both shipped too late to be included in this report. Preliminary tests rank the LaserFrame among the fastest erasable optical drives.

Figure 2: Disc Formats

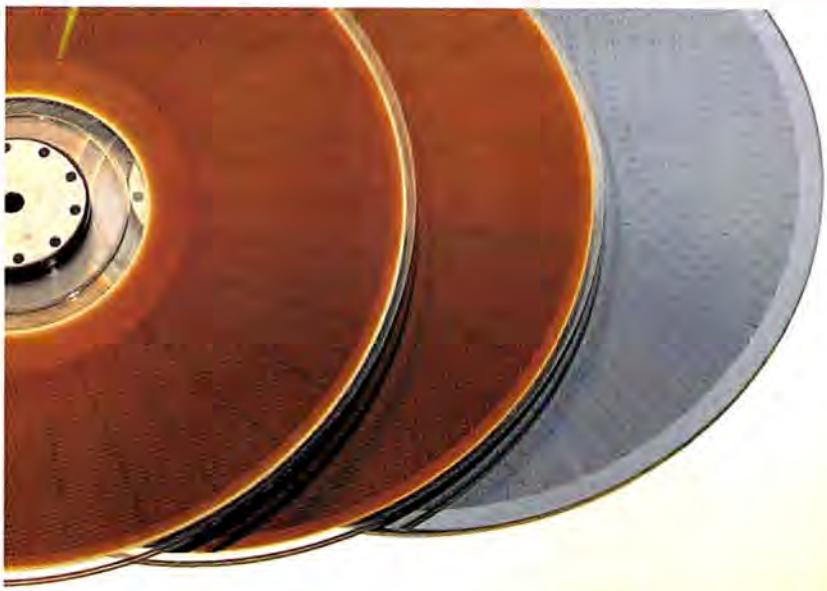


Figure 2: Sectors on erasable optical discs are physically imprinted onto the discs, visible to the naked eye. Left to right, the three sectors are the ISO-standard 512 and 1,024 bytes and the proprietary MaxOptix (Maxtor) format.

Long and available on Zmac, *MacUser*'s on-line service). We found that write rates are far more consistent among vendors than are read rates. The fastest write rate was 2.0 megabits per second for the FWB Sony-based drive, followed by 1.7 megabits per second for the Storage Dimensions drive. The next eight drives came in with write rates of 1.5 to 1.6 megabits per second, which was about half the rate of the Sony hard-disk drive optionally shipped with the Mac IIcx. For applications that mostly write instead of read data — backup is a good example — any one of the top ten performers in the SCSI Evaluator test will do fine.

Read rates were another story, differing widely among drives. Speeds ranged from a low of 1.2 megabits per second for the Procom MEOD650 drive to 4.7 megabits per second for the Storage Dimensions MacinStor, which performed a full 50 percent *faster* than our benchmark 40-megabyte magnetic hard disk! If your applications are generally read-intensive, the Storage Dimensions drive is by far the best choice in conjunction with its unique MaxOptix 1-gigabyte cartridge. But be forewarned: To be compatible with other vendors' drives, the MacinStor must use standard 650-megabyte cartridges that just aren't able to keep up with the high-speed, high-capacity 1-gigabyte cartridges.

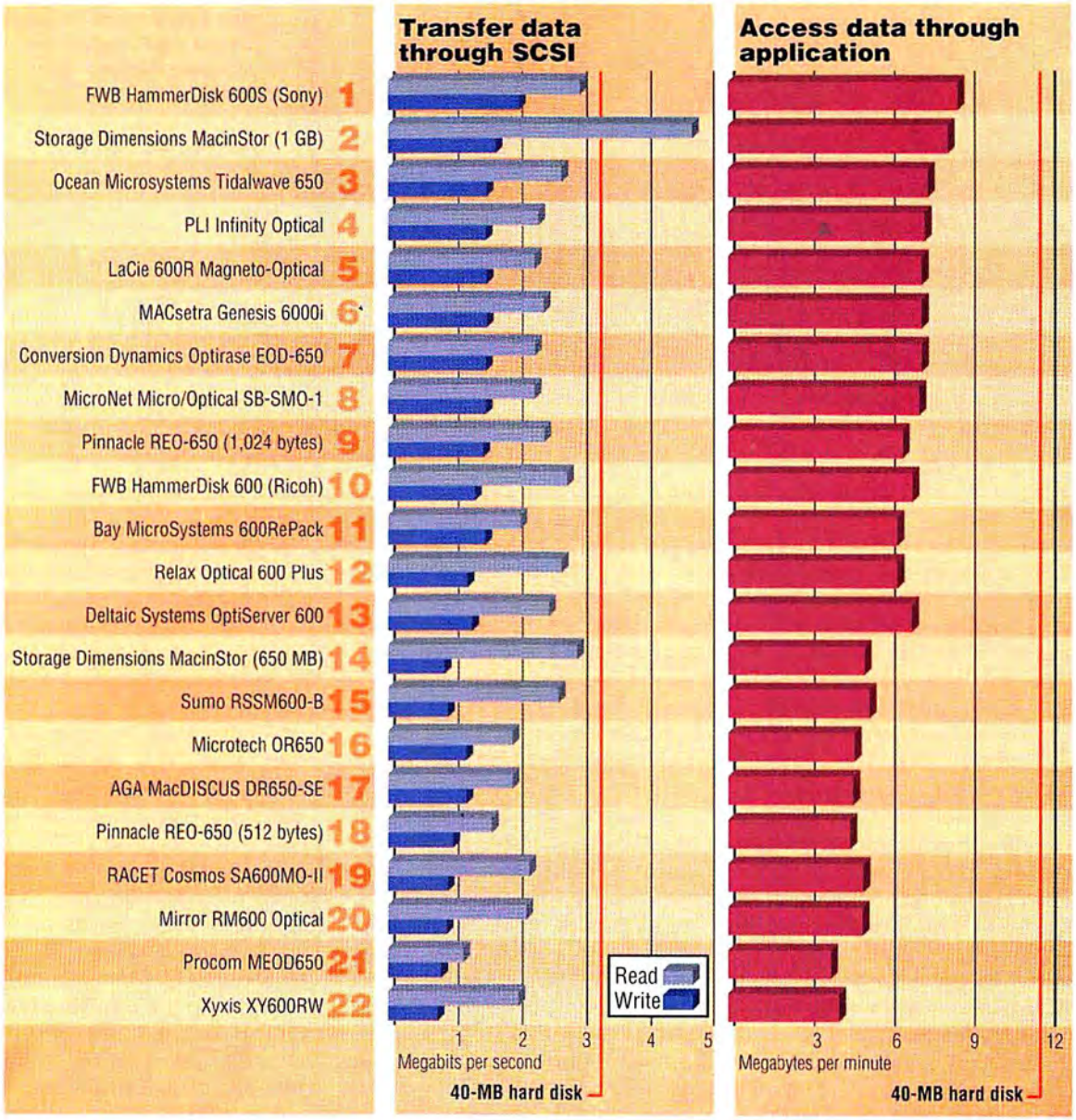
Our other tests measured read and write times combined and looked at different ways to access data. DiskBasher!, a benchmark developed by *MacUser* to test hard-disk drives (also available on-line on Zmac), simulates the way applications access data as the drives read and write 10 megabytes of medium-sized files of different lengths. The FWB Sony-based drive came in first, followed closely by the MacinStor and more distantly by the Ocean Microsystems Tidalwave 650, PLI Infinity Optical, LaCie 600R Magneto-Optical, MACsetra Genesis 6000i, and Conversion Dynamics Optirase EOD-650.

We obtained similar results when we made a copy of a 4.6-megabyte stack, using HyperCard's Save Copy command. Here the top four drives were the same as in the DiskBasher! test, and the Pinnacle REO-650 drive tied for third place. Apparently, the Pinnacle drive moves large files better than it does medium-sized files. If you move data in big chunks — for sound recording or color graphics, for instance — choose a drive that did well on this test.

We then used the Finder's Duplicate command to copy a 10-megabyte folder that contained a variety of files that might be found on a normal hard disk: lots of small files mixed with a few big ones. The results differed from previous tests. The top two drives remained the FWB HammerDisk 600S and the Storage Dimensions MacinStor, but the next-fastest were the Bay MicroSystems 600RePack, the LaCie 600R Magneto-Optical, and the MicroNet Micro/Optical SB-SMO-1. When you're copying a large quantity of small files, access time becomes more of a limiting factor than data throughput does, since the read/write head moves around more when it's looking for different files. If you're looking for an erasable optical drive for a file server that contains mostly text files, choose a drive that did well in this test.

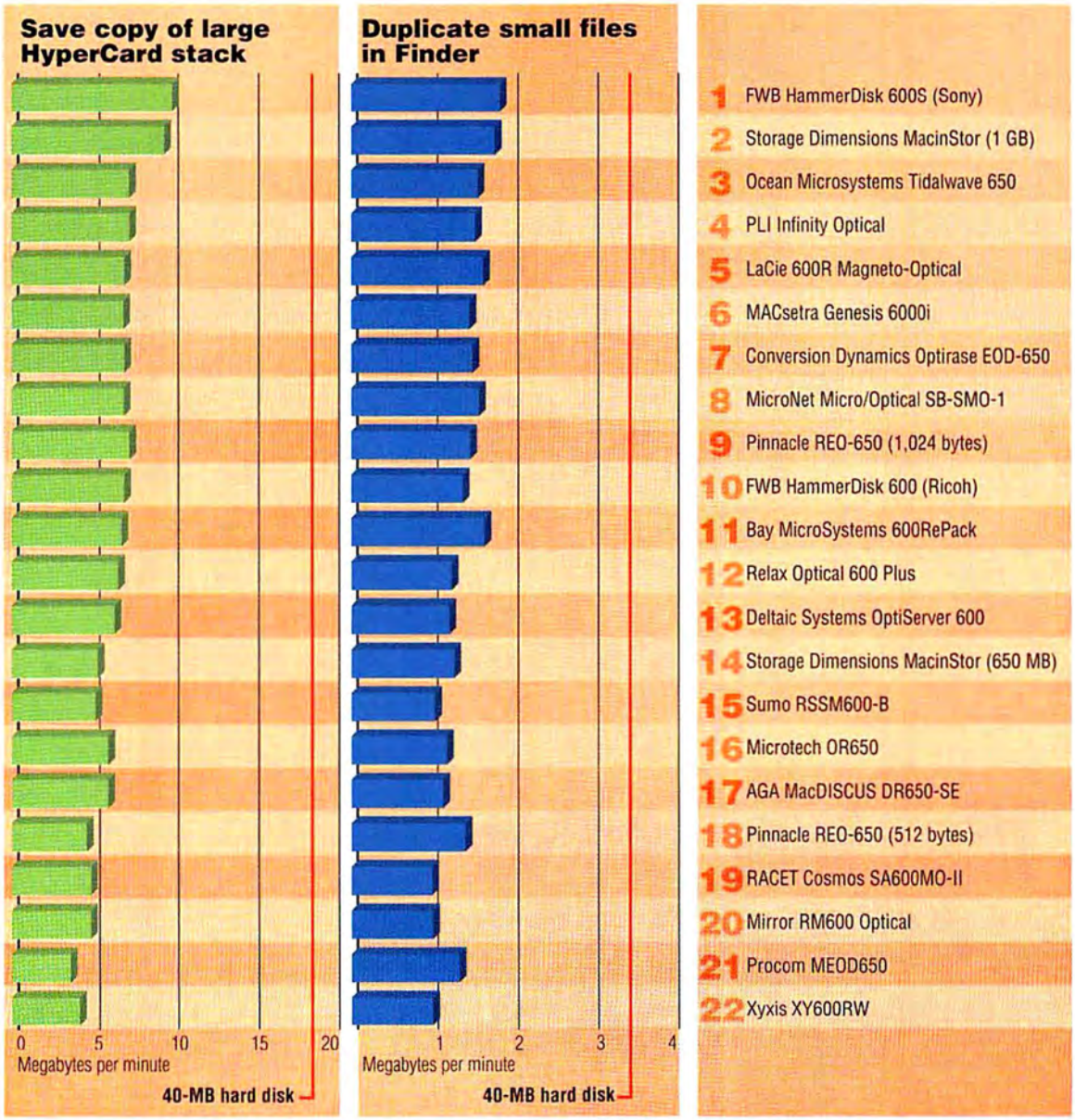
Figure 3: Performance of Erasable Optical Drives

Figure 3: We ranked all the drives according to performance and features. The FWB HammerDisk 600 is our overall winner, but only by a hair over the Storage Dimensions MacinStor. Some drives appear twice in the listing because we tested them with two differently formatted cartridges.



Transfer data through SCSI: We used SCSI Evaluator to separate the read and write data-transfer rates. The fastest read rate was produced by the Storage Dimensions MacinStor — the only instance in which an optical drive outperformed our control hard-disk drive. Write rates were much slower than that of the hard disk and didn't vary much among the top ten drives. Actual file-transfer rates won't be this high — this test doesn't consider file structures or other overhead.

Access data through application: The *MacUser* DiskBasher! benchmark simulates the way an application would write and read 10 megabytes of medium-sized files (such as those on a typical hard disk). This test and the following ones are not measures of raw throughput but simulate actual use. The FWB HammerDisk 600S came in first, followed closely by the Storage Dimensions MacinStor and more distantly by a close grouping of the next six drives.



Save copy of large HyperCard stack: To test how the drives handle large files, we used HyperCard to save a copy of a 4.6-megabyte stack. The top four drives were the same as in the DiskBasher! test, but the Pinnacle REO-650 tied for third place. Choose a drive that did well on this test for applications, such as sound recording or color graphics, that move data in big chunks.

Duplicate small files in Finder: Using the Finder's Duplicate command, we measured how quickly each drive could copy a 10-megabyte folder containing mostly small files. The rates here were slower than in the other tests, because the Finder must keep track of filenames and file types and because there were many files. The Bay MicroSystems, LaCie, and MicroNet drives came in behind our two leaders. Drives that did well here would be good candidates for file servers containing mostly text files.

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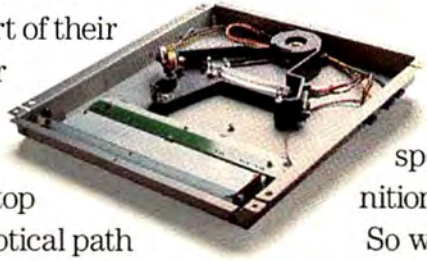
If you looked inside their products you'd find Pentax sub-assemblies such as lenses, mirrors, image reading heads, and laser scanning units. Devices that bear the mark of 70 years of optical and electronic experience. And of recent Pentax innovation.

While it's nice to be a part of their successes, we now have our own line of optical-based peripherals you should know about. Take our desktop scanner. A unique folded optical path enhances accuracy and image quality, making it ideal for optical character recognition (OCR).



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Soft Sell

A big part of what makes a good drive is software. Developers often say that creating the hardware was a snap but that the software required the real engineering effort (the speed of a drive is determined partly by how well the driver software residing inside the drive was written). In addition to efficient programming to match the hardware, there are certain tricks that several of the faster erasable optical drives use.

Caching is one such trick. Developers of driver software store frequently used data in a drive-resident RAM cache, from which the data can be retrieved more quickly than from the disc. Another trick is using *blind data transfers* through the SCSI bus. Normally, when a signal is being sent to the Mac via the SCSI interface, a drive waits for a *handshake* from the Mac before it sends the data. Bypassing the handshaking routine greatly speeds up data transfer. Most vendors, including Sony, do not yet use blind transfers, but Sony told us that use of this method should not endanger data reliability.

Speed isn't the only criterion on which to base a buying decision. The software packages bundled with the drives also differ radically. Some vendors bundle partitioning software, which can be useful for drives as large as these, with their formatting software. Partitioning divides the disc into several separate volumes that are mounted on the desktop independently of each other. Partitioning is of little use if you're streaming massive amounts of data onto a disc, however.

The LaCie 600R Magneto-Optical comes with LaCie's justly famous SilverLining formatting/partitioning software. Although its interface isn't fancy, SilverLining provides a significant performance increase. MACsetra has good formatting software that is optimized for speed; we also found it capable of erasing a cartridge in 14 seconds, a procedure

On the Horizon

Although the ISO standard has brought compatibility to erasable optical drives, it hasn't stifled the creativity of optical engineers. For example, at least three companies are betting that Mac users will prefer compact, "slip into your pocket" erasable optical media.

By the time you read this, Pinnacle should be shipping the REO-130 3.5-inch erasable optical drive plus new high-performance driver software called FlashCache. The software lets the drive (manufactured by MOST) write data in two passes rather than in the normal three, boosting write throughput at least 33 percent. The REO-130 will sell for $2,995, with discs costing $129 each, and will support discs with 512- or 1,024-byte sectors. Pinnacle Micro, 15265 Alton Parkway, Irvine, CA 92718; (800) 553-7070 or (714) 727-3300.

Ocean Microsystems has announced the Vista 130, a $3,000 drive that uses 3.5-inch cartridges that hold 130 megabytes each. Ocean claims that Vista speed rivals that of some hard-disk drives. This drive, which also uses the MOST mechanism, fits under a classic Mac and uses only single-sided media ($130 each). Ocean Microsystems, Inc., 246 Hacienda Ave., Campbell, CA 95008; (800) 262-3261.

Even though midget erasable optical cartridges are just appearing, MACsetra is already introducing a "second generation" 3.5-inch drive for less than $3,000. The company will also provide a free upgrade to version 4.0 of its driver software and is promising substantial speed improvement for its 6000i (5.25-inch) drive. MACsetra Technologies International, 2414 Koyl Ave., Saskatoon, Saskatchewan S7L 7L5, Canada; (800) 661-6000 or (306) 934-6044.

Things are also hopping in the 5.25-inch world. The new Panasonic LF-7010 multifunction optical drive ($5,000) uses *phase-change technology* to write data up to 33 percent faster than standard magneto-optical technology. The rewritable discs can each store up to 1 gigabyte and will cost around $250. This 5.25-inch drive can also write to and read WORM-disc cartridges. Panasonic Communications & Systems Co., Panasonic Office Automation, Two Panasonic Way, Secaucus, NJ 07094; (800) 742-8086.

Since the Pioneer DE-S7001 Rewritable Multifunction Optical Disk Drive ($4,695) uses the same format used by WORM drives to read, write, and erase data, it's not compatible with the other erasable optical drives in our report. The DE-S7001 features a 53-millisecond average seek and supports both 512-byte- and 1,024-byte-sector 5.25-inch discs as well as WORM. Pioneer Communications of America, Inc., Sherbrooke Office Center, 600 E. Crescent Ave., Upper Saddle River, NJ 07458-1827; (800) 527-3766 or (201) 327-6400.

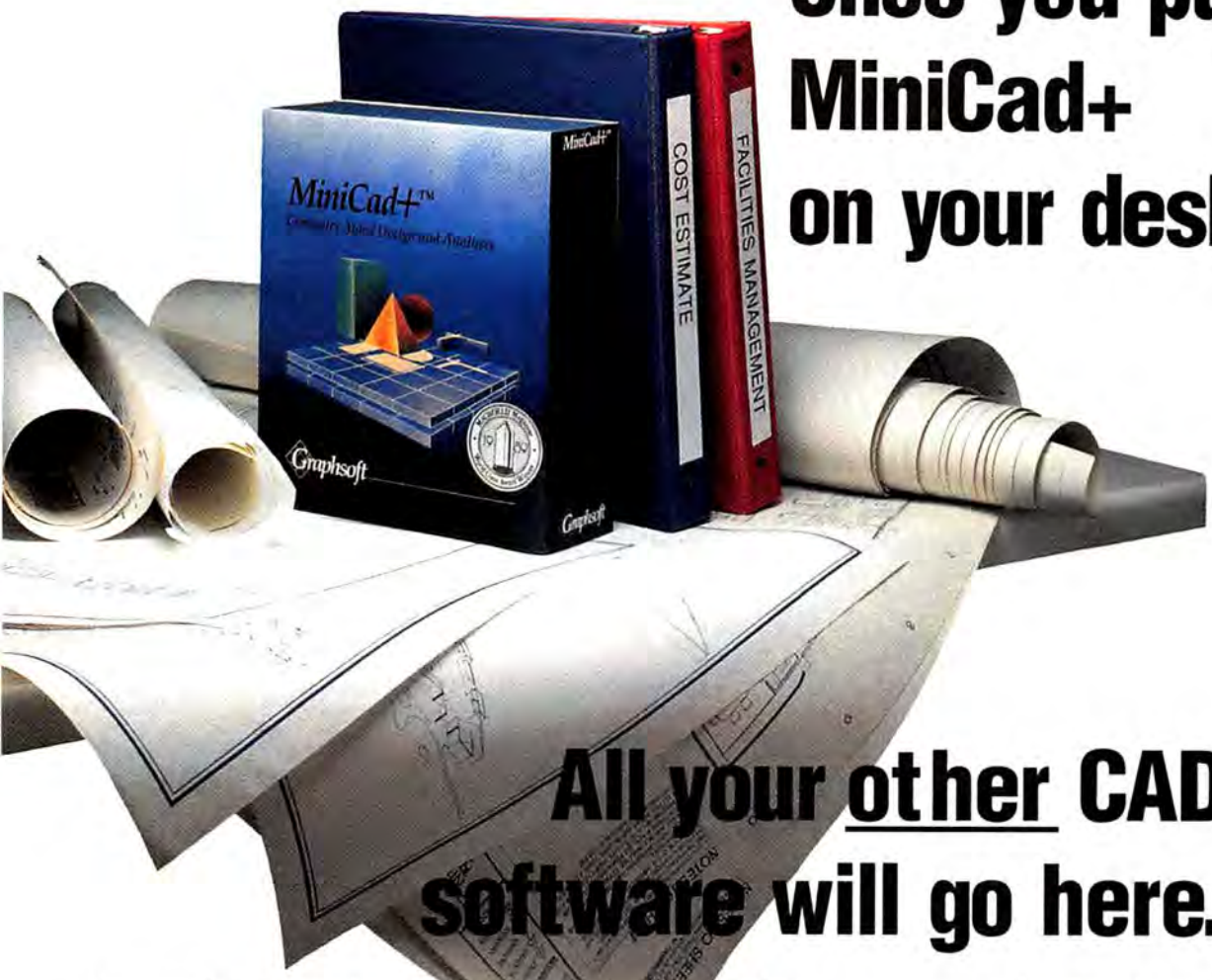
New 3.25-inch drives, such as the Ocean Microsystems Vista 130 (right), can hold 130 megabytes. Multifunction drives such as the Pioneer DE-S7001 (center) write to and read both WORM and erasable optical cartridges. The MicroNet CMO-1 (left) spins its discs at a fast 300 rpm to increase throughput.

The OptiXchange ($5,995) from Ten X Technology uses the multifunction Pioneer DE-S7001 mechanism but performs caching and data compression/expansion on the fly to improve throughput. Ten X Technology, Inc., 4807 Spicewood Springs Road, Building 3, Suite 3200, Austin, TX 78759; (800) 922-9050 or (512) 346-8360.

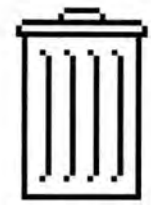
MicroNet now offers the CMO-1, a 5.25-inch sampled-servo MO drive manufactured by Canon, which spins the disc at a fast 3,000 rpm, thus increasing read rates to 675K per second. MicroNet will sell this drive for $4,295 or bundled with Retrospect backup software for $4,395. MicroNet Technology, Inc., 20 Mason, Irvine, CA 92718; (714) 837-6033.

— Paul R. Freedman

Once you put MiniCad+ on your desktop...



All your other CAD software will go here.



There are a lot of contenders—and pretenders—coming into the Macintosh market with so-called "full-featured" CAD programs. But there's one program these imitators won't compare to: MiniCad+. It set the standard for all Mac CAD programs when it was introduced in 1986, and continues to set the pace in Macintosh-aided design.

Discover Our Dimensions

MiniCad+ is an award-winning 2D/3D package. Whether you're designing a house or high-tech mousetrap, you'll find the precision you need.

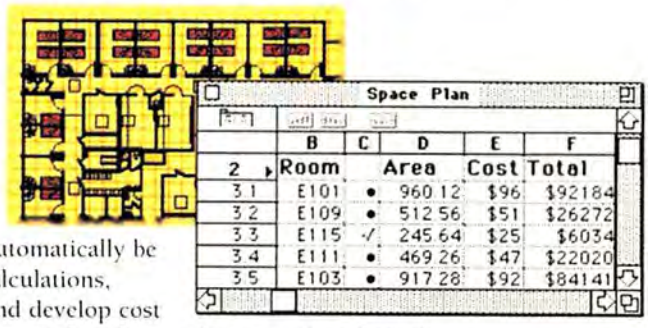
Smarter than the Average Mouse

Our "Smart Cursor" automatically highlights, identifies and aligns relevant snaps, intersections, tangents and parallels. Snap to the precise point every time with more ease than you've experienced with any other program. We built the brains into MiniCad+ so you can think of more important things.

Click with Intelligence

Track, Compare, Analyze

Unlike any other drawing program, MiniCad+ provides an integrated worksheet—literally, a spreadsheet and database in one—hot-linked to your drawings. Attach records such as type, cost, P.O. number or size and display at will. As you change an object's attributes, the worksheet will automatically be updated. Compute area calculations, compile parts schedules and develop cost estimates. No longer will you tediously count objects in your drawing manually—the worksheet will count it for you.



	B	C	D	E	F
2	Room		Area	Cost	Total
3 1	E101	•	960 12	$96	$92184
3 2	E109	•	512 56	$51	$26272
3 3	E115	√	245 64	$25	$6034
3 4	E111	•	469 26	$47	$22020
3 5	E103	•	917 28	$92	$84141

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Table 1: Optical Discs at a Glance

	Pros	Cons	Best Uses
Erasable	• rewritable • holds up to 1 gigabyte • data stable at least 10 years	• expensive hardware • slow	• secondary storage • electronic prepress • document processing
WORM	• data stable up to 100 years • writes once • holds up to 1 gigabyte	• writes only once • expensive hardware	• on-line archiving
CD-ROM	• multiplatform standardization • holds 650 megabytes • permanent data storage • inexpensive hardware and media	• slowest optical technology • read-only	• retail data and software distribution • in-house data distribution

Table 1: Erasable optical drives were preceded by two other optical technologies: CD-ROM (compact disc, read-only memory) and WORM (write once, read many). Each technology has a different purpose in the Mac environment.

that normally takes several minutes, even on the fastest drives. Both the FWB and the Bay MicroSystems software is very easy to manage. We also liked the software from Xyxis, which offers a lot of partition formats from which to choose. At press time, Pinnacle was working on its FlashCache software, which speeds up the writing process by performing a pre-erase on the cartridge.

Everyone needs to back up (yes, even you), and several companies ship some very good backup software with their optical drives. Storage Dimensions and Procom bundle Dantz Software's Retrospect, a full-featured, highly rated backup program. RACET's backup software, MacXpress for the Macintosh, allows unattended archiving.

Other bundles include various additional utilities. Microtech has one of the best bundles, including its own Total Recall software, which features automatic unattended backup, and Norton Utilities for the Macintosh, one of the best disk-optimization and data-recovery packages on the market. FWB provides a handy utility that lets you duplicate copy-protected software on the cartridge. Mirror bundles Central Point's MacTools Deluxe. Procom's software displays the optical drive's SCSI-ID number right on the mounted icon, which helps prevent SCSI conflicts.

Compatibility and Standards

Disc-format, error-correction, and SCSI-interface standards have been developed by the ISO (International Standards Organization) to allow a cartridge written in one vendor's drive to be used in another's. Because of these standards, erasable optical cartridges now enjoy more compatibility among vendors than does the older WORM technology (see the "WORM" sidebar). Erasable optical drives haven't yet achieved the level of Mac-to-PC compatibility that CD-ROMs enjoy, though (see Table 1). An industry committee is working on such a *multiplatform* standard, but don't expect any results until sometime in mid-1991.

Most of the drives we tested have at least one ISO-compliant mode. The exceptions are the Xyxis XY600RW (Xyxis was planning an ISO-compliant version at press time) and the MicroNet drive, which uses cartridges that can be read only by ISO-compliant drives based on the Sony mechanism.

Of course, a non-ISO format is perfectly fine if you don't plan to share your data, but there is always the question of obsolescence — if you plan to keep your data around for several years and your drive dies, you'll want to buy a drive that can read your existing format.

Because it has the full backing of Sony, the biggest mover and shaker in the optical world today, it isn't likely that the ISO standard will become obsolete soon. Sony has had a hand in defining standards for everything from audio CD to erasable

Recording: Magneto Optical
Formatted Capacity: 454 MB
Media Size: 5.25 Inch
Read Rate: 675 KiloBytes/sec
Media Life: 10 Years Plus
Cleaning Kits: Head and Media
Air Filter: User Changeable

The World's Fastest Optical System! The Canon MO by MicroNet.

MicroNet is proud to offer the fastest rewritable optical disk system available.

The difference is clear with the new Canon MO. Unlike other systems it spins at 3,000 rpm, achieving sustained reads of 675 KiloBytes per second. This is greater than double the rate of other systems.

A great deal of attention has been paid to reliability. As a result the Canon MO has become a reality far in advance of its time. The subsystem has been designed to work perfectly under various operating conditions, employing a unique air flow and dust filtration system.

The optical disks can be safely stored for many years or locked away for security.

MicroNet supports auto-lock and eject to ensure data integrity. Our device drivers are maintained by our engineers to be fully compatible with Apple's latest System and we support any Macintosh with a SCSI port.

Our optical systems are ideal for publishing and sound applications, since storing or transporting of large files is safe, easy and cost effective.

MicroNet is noted for superior quality and excellent technical support. When it's all said and done, MicroNet's optical storage products are simply the finest that money can buy.

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optical discs. Ricoh and Maxtor were quick to comply with the ISO standards and will probably continue to follow standards supported by Sony. This is not to say that drives with a Sony mechanism have an advantage; ISO-compliant Sony, Ricoh, and Maxtor mechanisms can all read each others' cartridges.

Some barriers to compatibility remain. A few drives offer proprietary formats in addition to the ISO-standard format. The Storage Dimensions drive can write to and read two types of optical cartridges: an ISO-compliant 650-megabyte cartridge and a non-ISO 1-gigabyte cartridge (the one that did so well in our speed tests). MicroNet also offers a double drive that writes to both types of cartridges at once (yielding a single 600-megabyte mounted volume), but its cartridges can't be read by other drives.

The ISO-standard data format supports sectors containing 512 or 1,024 bytes each. Although all drives can read and write cartridges that have been formatted in compliance with the ISO 512-byte-sector standard, only five can also write to and read the faster ISO 1,024-byte-sector cartridges. We tested both formats on the Pinnacle drive and found that the 1,024-byte-sector cartridge was about 50 percent faster than the 512-byte-sector version. The unique MaxOptix 1-gigabyte cartridges used in the Storage Dimensions MacinStor writes to and reads 512-byte sectors both in the ISO format and in a unique array that allows one cartridge to contain a full megabyte (see Figure 2).

Drives also differ in what version of Apple's partitioning format they support. Some of the drives follow the specifications of Apple's *Inside Macintosh, Volume IV* (*IMV4*), whereas others follow the more recent *IMV5*. The newer drives can read cartridges from *IMV4* drives, but the reverse is not true. In addition, *IMV5* supports AU/X and *IMV4* does not.

To Buy or Not to Buy

Which brings us once again to the Eternal Question: Should you buy an erasable optical drive at this time, or should you wait? Despite gains in speed, optical drives aren't adequate replacements for hard-disk drives — the slowest hard-disk drive is still as quick as the fastest erasable optical drive — but optical drives are far more than a technological curiosity. They offer stable data storage that is large, safe, removable, and substantially cheaper than hard disks at large capacities.

If you decide to go with erasable optical, look beyond the OEM name for speed: A Sony mechanism does not guarantee a fast drive (see "The Bottom Line" for our picks). Or you can wait until erasable optical drives are as fast as hard disks, which may eventually happen. Then again, if you had waited until Macintosh computers were as inexpensive as equally powerful PCs, you'd still be using an abacus.

John Rizzo is *MacUser*'s technical editor. His many articles on optical technology, connectivity, and scientific applications for the Mac would barely fit on an optical cartridge.

The Bottom Line

Even with recent improvements in erasable-optical-drive technology, speed is still the biggest concern — even if you plan to use your drive only for secondary storage. A year ago, the Storage Dimensions MacinStor was the fastest erasable optical drive, beating the competition by a wide margin.

This year, however, the **FWB HammerDisk 600S** ($5,495 with the Sony mechanism) is the champ, if only by a nose. FWB software engineers have pushed their drive ahead of other Sony-based opticals, enough to surpass even Storage Dimensions' fast Maxtor internal mechanism.

If you plan to use your drive mostly for tasks that involve reading discs, however, the **Storage Dimensions MacinStor** ($7,995) will be the fastest choice. The MacinStor offers the largest storage capacity — 1 gigabyte — at overall speeds only slightly below those of the FWB HammerDisk 600S. The MacinStor's unique 1-gigabyte format can't be read by other drives, however, so don't plan to swap these cartridges with other manufacturers' drives. The MacinStor can format, read, write, and erase a standard 650-megabyte cartridge, but its performance suffers when it uses this type of cartridge.

The only other drive we tested that's as fast as these two drives is a prerelease version of the **SuperMac LaserFrame** drive (see the "Late Arrivals" sidebar), which is supposed to be shipping by the time you read this. Moving down to a lower level of performance, we can recommend the **Ocean Microsystems Tidalwave 650** ($4,195), the **PLI Infinity Optical** ($5,695), the **LaCie 600R Magneto-Optical** ($4,099), and the **MACsetra Genesis 6000i** ($5,495), a second string of drives with performance that nevertheless stands out above the crowd.

The FWB HammerDisk 600S (left) barely squeaked past another speedster, the Storage Dimensions MacinStor (right). An optional MacinStor nonstandard format stores up to 1 gigabyte — over 400 megabytes more than the HammerDisk 600S.

RELIABILITY.

"After thousands of hours of use, we've never had a cartridge fail while in a DPI drive."

-BMUG Newsletter, Vol. VI, No. I

44MB REMOVABLE

"The best of all the SyQuest removable drives available"
–BMUG Newsletter Vol. V, No. II

Compatible with IBM, Amiga, Atari, and all Macs.

DPI 44R .....Call for Our Lowest Pricing!

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Transfer IBM DOS files to Macintosh format. Uses 5 1/4" MS/DOS 1.2 Mb or 360k diskettes. Compatible with SoftPC and AccessPC.

DPI 1.2/360.....$399

1.4MB FLOPPY DISK DRIVE

DPI's new 1.4 megabyte floppy disk drive supports Apple's new High-Density standard as well as MS/DOS format 1.44MB and 720K floppies. SCSI interface makes it compatible with all Macs from the Plus on up, without the need for an expensive ROM upgrade. Compatible with SoftPC and AccessPC.

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FAX 408-945-8148

Table 2: Features of Erasable Optical Drives

	AGA MacDISCUS DR650-SE $$$	Bay MicroSystems 600RePack $$$½	Conversion Dynamics Optirase EOD-650 $$$$	Deltaic Systems OptiServer 600 $$$½
List price	$3,795	$3,600	$5,450	$3,699
Disc price	$250	$200	$225	$199
Comments	Slow. Toll-free support. Easily auto-mounts (even without INIT). Partitions can be write-protected.	Software low on features but easy to use. Few utilities.	Good speed. Toll-free support. Has auto-switching power supply. Includes Redux software.	Software maps out bad sectors, parks heads. Extremely quiet drive. Few software utilities.
Hardware				
Advertised megabytes, both sides	650 MB	600 MB	594 MB	594 MB
Formatted megabytes, one side	313.88 MB (w/ 1,024 disc)	285.9 MB	284.4 MB	286.4 MB
OEM mechanism	Sony SMO-C501-00 2.05	Sony SMO-C501-00 2.11	Sony SMO-C501-00 2.07	Ricoh RO-5030E2 A
SCSI-ID selector	ext. DIP switches	ext. DIP switches	ext. recessed push wheel	ext. recessed push wheel
SCSI termination	internal, with switch	internal, with switch	external	external
Data standards				
Apple partition format*	*IMV5*	*IMV4*	*IMV5*	*IMV4*
Disc-sector sizes (bytes)	512/1,024 bytes	512 bytes	512 bytes	512 bytes
ISO-standard compliance (130mm)	yes	yes	yes	yes
Software				
Partitioning	yes	no	yes	no
Backup	yes	no	yes	no
Password protection	no	no	no	no
Data encryption	no	no	no	no
Disc optimizer	no	no	no	no
Diagnostics	yes	yes	no	yes
Other				
Dimensions (L x W x H, inches)	12.25 x 8.25 x 5	12.25 x 8.25 x 5.0	10 x 9.5 x 4.75	9.75 x 9.75 x 4.75
Warranty	1 year	1 year	1 year	6 months
	AGA, Inc. 653 11th Ave. New York, NY 10036 (800) 347-2871 (212) 265-0655	Bay MicroSystems, Inc. 210 Columbus Ave., #108 San Francisco, CA 94133 (415) 563-8392	Conversion Dynamics, Inc. 1200 Corporate Drive, #150 Birmingham, AL 35242 (800) 752-7058 (205) 991-8338	Deltaic Systems 1701 Junction Court, #302B San Jose, CA 95112 (408) 441-1240

*Disc partitions are defined by specifications in *IMV5* (*Inside Macintosh, Volume 5*) or in the older *IMV4*.

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Until recently, high-resolution output also meant high cost. Not anymore.
Personal Typesetting by LaserMAX lets you maximize your Macintosh — at an affordable price.

LaserMAX 1000 Personal Typesetter

- Produces camera-ready type on plain paper.
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- Includes 135 world-class typefaces.
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- Produces Near-Typeset Quality on plain paper from your Apple LaserWriter™.
- Delivers crisp 800 x 800 TurboRes or 400 x 400 TurboRes output.
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No Jaggies

Our LaserMAX 1000 Personal Typesetter provides 1000 x 1000 TurboRes output at an affordable $7,995. Or if you already own any Apple LaserWriter™, our MX6 printer controllers upgrade your output to either 400 or 800 dots per inch.

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If low cost and high resolution are not enough, then consider our printing speed. Using our Advanced Printing Mode, our products communicate directly with applications and can print up to 20 times faster than a PostScript™ printer.

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(300 x 300)
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Table 2: Features of Erasable Optical Drives, continued

	FWB HammerDisk 600 ‡‡‡‡	FWB HammerDisk 600S ‡‡‡‡½	LaCie 600R Magneto-Optical ‡‡‡‡	MACsetra Genesis 6000i ‡‡‡‡
List price	$4,995	$5,495	$4,099	$5,495
Disc price	$275	$275	$259	$250
Comments	Fastest Ricoh drive, faster than many Sony drives. Same software as FWB's Sony version.	Fastest drive overall. Software overrides copy-protection. No auto-eject on dismount or shutdown.	Among top 5 fastest. Good format software provides fast SCSI performance. Includes SilverLining disk-management software.	Good speed and software. Fast erase. Filtered fan. Can combine many discs into single volume.
Hardware				
Advertised megabytes, both sides	600 MB	600 MB	600 MB	594 MB (650 w/ 1,024 disc)
Formatted megabytes, one side	284.6 MB	286.38 MB	286.1 MB	286.36 MB (w/ 512 disc)
OEM mechanism	Ricoh RO-5030E2 A	Sony SMO-C501-00 2.07	Sony SMO-C501-00 2.07	Sony SMO-C501-00 2.11
SCSI-ID selector	ext. recessed push wheel	ext. recessed push wheel	ext. DIP switches	ext. rotary switch
SCSI termination	external	external	internal, with switch	internal, with switch
Data standards				
Apple partition format*	*IMV4*	*IMV4*	*IMV5*	*IMV5*
Disc-sector sizes (bytes)	512 bytes	512 bytes	512 bytes	512/1,024 bytes
ISO-standard compliance (130mm)	yes	yes	yes	yes
Software				
Partitioning	yes	yes	yes	yes
Backup	no	no	no	no
Password protection	yes	yes	yes	no
Data encryption	yes	yes	no	no
Disc optimizer	no	no	yes	no
Diagnostics	yes	yes	yes	yes
Other				
Dimensions (L x W x H, inches)	9.75 x 9.5 x 4.5	9.75 x 9.5 x 4.5	12.25 x 8.25 x 5.0	10.5 x 9.75 x 5.5
Warranty	1 year	1 year	1 year	1 year
	FWB 2040 Polk St., Suite 215 San Francisco, CA 94109 (415) 474-8055	FWB 2040 Polk St., Suite 215 San Francisco, CA 94109 (415) 474-8055	LaCie, Ltd. 19552 S.W. 90th Court Tualatin, OR 97062 (800) 999-0143 (503) 691-0771	MACsetra Technologies 2414 Koyl Ave. Saskatoon Saskatchewan S7L 7L5 Canada (800) 661-6000

*Disc partitions are defined by specifications in *IMV5* (*Inside Macintosh, Volume 5*) or in the older *IMV4*.

A drive is a drive, is a drive... or is it?

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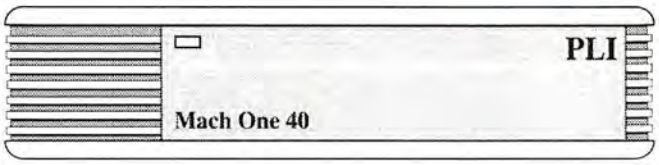
PLI's proprietary new technology sets new performance standards with less than 1 ms access time and 5MB data transfer rate. No other drive is faster or safer. The perfect accelerator for your graphics, network servers and multi-media applications.



The Infinity 40 Turbo 45MB Removable Cartridge Drive

With PLI's Infinity 40 Turbo, 45MB removable drive, you get 12ms effective access times, unlimited storage, IBM compatibility and valuable software (including AME from Casady and Greene and The Best of BMUG shareware). You also get PLI's ex-perience and guaranteed high quality. The Infinity 40 Turbo is available as a single drive or a twin with another removable, or any 3.5" or half-height drive. It is perfect as a primary or secondary drive, for backup, archiving or software distribution.

A.M.E. INCLUDED AND NOW SHIPPING

- External address and termination switching
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Table 2: Features of Erasable Optical Drives, continued

	MicroNet Micro/Optical SB-SMO-1 ⚡⚡⚡⚡	Microtech OR650 ⚡⚡⚡	Mirror RM600 Optical ⚡⚡⚡	Ocean Microsystems Tidalwave 650 ⚡⚡⚡⚡
List price	$4,995	$4,795	$3,497	$4,195
Disc price	$279	$249	$249	$249
Comments	Good speed. Can turn off verify pass during write. Can combine many discs into single volume.	Slow. Good software (Total Recall) allows unattended backup. Also includes Norton Utilities for the Macintosh.	Slow. Software allows manual sector mapping. Auto-eject option at dismount or shutdown.	Third-fastest overall. Includes MacTools Deluxe (good utilities), plus program to find and mount Ocean drives on SCSI bus.
Hardware				
Advertised megabytes, both sides	600 MB	650 MB	600 MB	594 MB
Formatted megabytes, one side	285.8 MB	312.34 MB (w/ 1,024 disc)	284.6 MB	286.37 MB
OEM mechanism	Sony SMO-C501-00 2.11	Sony SMO-C501-00 2.11	Ricoh RO-5030E2 C	Sony SMO-C501-00 2.05
SCSI-ID selector	ext. recessed push wheel	ext. DIP switches	ext. DIP switches	ext. recessed push wheel
SCSI termination	external	internal, with switch	external	external
Data standards				
Apple partition format*	*IMV5*	*IMV5*	*IMV5*	*IMV4*
Disc-sector sizes (bytes)	512 bytes	512/1,024 bytes	512 bytes	512 bytes
ISO-standard compliance (130mm)	with Sony/ISO drives only	yes	yes	yes
Software				
Partitioning	yes	yes	yes	yes
Backup	no	yes	yes	no
Password protection	yes	no	yes	yes
Data encryption	no	no	no	no
Disc optimizer	no	yes	no	no
Diagnostics	yes	yes	yes	yes
Other				
Dimensions (L x W x H, inches)	12 x 7.5 x 10.5	12.25 x 8.25 x 4.75	12 x 7.5 x 6.5	10.5 x 9.5 x 5.0
Warranty	1 year	2 years	1 year	1 year
	MicroNet Technology, Inc. 20 Mason Irvine, CA 92718 (714) 837-6033	Microtech International 158 Commerce St. East Haven, CT 06512 (800) 626-4276 (203) 468-6223	Mirror Technologies 2644 Patton Road Roseville, MN 55113 (800) 654-5294 (612) 633-4450	Ocean Microsystems, Inc. 246 E. Hacienda Ave. Campbell, CA 95008 (800) 262-3261 (408) 374-8300

*Disc partitions are defined by specifications in *IMV5* (*Inside Macintosh, Volume 5*) or in the older *IMV4*.

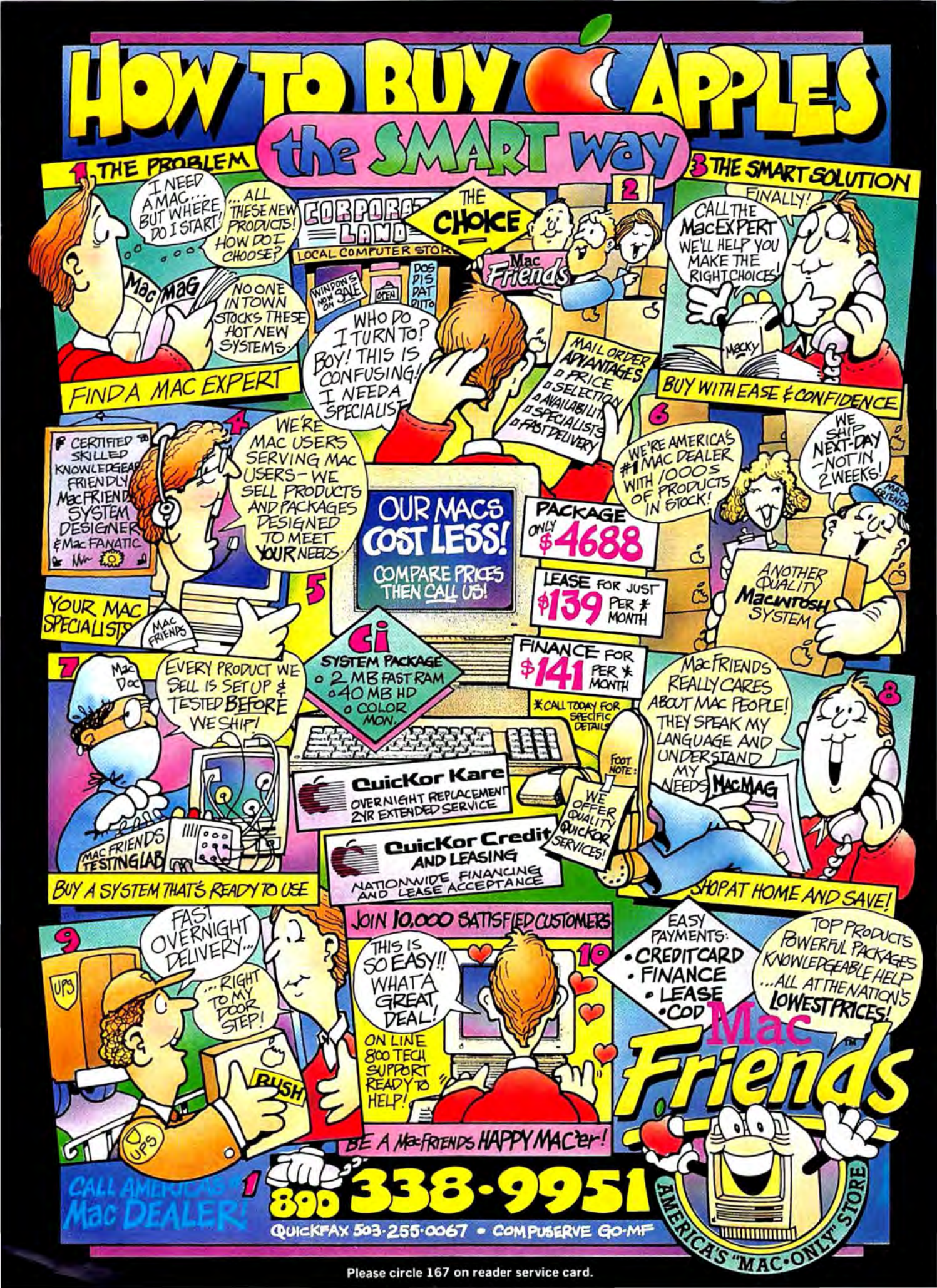

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Table 2: Features of Erasable Optical Drives, continued

	Pinnacle REO-650 ★★★½	PLI Infinity Optical ★★★★	Procom MEOD650 ★★★	RACET Cosmos SA600MO-II ★★★
List price	$5,190	$5,695	$4,495	$4,795
Disc price	$250	$299	$295	$298 (precertified)
Comments	Average speed, but new cache software should improve performance. A/UX option. Voltage selector. Few utilities.	Among five fastest. A/UX option allows 1,024-byte-sector discs. TurboSpool print spooler included. Vertical stand.	Very slow. Desktop icon has SCSI ID. Only drive with 25-pin SCSI connectors. Includes Retrospect backup software.	Slow. Unattended backup with archive log, shutdown. Software option combines discs into volume.
Hardware				
Advertised megabytes, both sides	594 MB (650 w/ 1,024 disc)	600 MB	582 MB	600 MB
Formatted megabytes, one side	286 MB (312 w/ 1,024 disc)	286.39 MB (w/ 512 disc)	286.39 MB	283.14 MB
OEM mechanism	Sony SMO-C501-00 2.07	Sony SMO-C501-00 2.05	Sony SMO-C501-00 2.07	Ricoh RO-5030E2 C
SCSI-ID selector	ext. DIP switches	ext. recessed push wheel	ext. rotary switch	ext. recessed push wheel
SCSI termination	external	external	internal, with switch	external
Data standards				
Apple partition format*	*IMV5*	*IMV4*	*IMV5*	*IMV5*
Disc-sector sizes (bytes)	512/1,024 bytes	512 bytes (1,024 optional)	512 bytes	512 bytes
ISO-standard compliance (130mm)	yes	yes	yes	yes
Software				
Partitioning	no	yes (w/ optional software)	yes	yes (w/ optional software)
Backup	no	yes	yes	yes
Password protection	no	yes	yes	no
Data encryption	no	no	yes	no
Disc optimizer	no	yes	no	no
Diagnostics	yes	yes	yes	no
Other				
Dimensions (L x W x H, inches)	13 x 8 x 5.75	11.5 x 9.75 x 5	12 x 7.5 x 6.25	15 x 7 x 5
Warranty	1 year	1 year	1 year	3 years
	Pinnacle Micro 15265 Alton Parkway Irvine, CA 92718 (800) 553-7070 (714) 727-3300	PLI 47421 Bayside Parkway Fremont, CA 94538 (800) 288-8754 (415) 657-2211	Procom Technology, Inc. 200 McCormick Ave. Costa Mesa, CA 92626 (714) 549-9449	RACET computes, Ltd. 3150 Birch St. Brea, CA 92621 (714) 579-1725

*Disc partitions are defined by specifications in *IMV5* (*Inside Macintosh, Volume 5*) or in the older *IMV4*.

CLAIMS VS. ACCLAIMS

A lot of manufacturers say they have the best trackball, but only the Kensington Turbo Mouse® has the awards to prove it.

MacUser gave it the coveted Five Mice. And the readers of Macworld magazine voted it "Best Input Device" — not just once but *four years in a row.*

What makes Turbo Mouse outshine the rest?

Superior optical hardware and unique software are the difference.

A light click sends the signal quietly and instantly.

One button transmits a normal mouse command. The other locks the button in the down position for extended selection and graphic applications. You decide which button performs what function.

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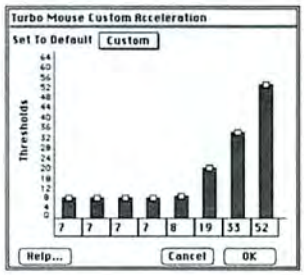
Navigating the screen is easy. A comfortable ball position makes the cursor easy to move. And a smooth ball movement means no jumping or sticking.



What's more, only Turbo Mouse has a Custom Control Panel that lets you adjust both acceleration and double-click speed to exactly match the way you work. Move the ball slowly and the cursor moves pixel-by-pixel. Move it fast and it speeds across even the biggest screen.

The next time you read another claim for a trackball, remember the one that has earned all the acclaims. Turbo Mouse.

For a free brochure, and the dealer nearest you, call 800-535-4242. Outside the U.S.A., call 212-475-5200.

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Table 2: Features of Erasable Optical Drives, continued

	Relax Optical 600 Plus ★★★½	Storage Dimensions MacinStor ★★★★½	Sumo RSSM600-B ★★★	Xyxis XY600RW ★★★
List price	$4,399	$7,995	$4,300	$5,245
Disc price	$225	$295 (gigabyte, $395)	$250	$275
Comments	Built-in power control. Surge protection and noise filtering. Compact case.	Top capacity (non-ISO mode). Fastest read, second overall. ISO-standard 650-MB version slower. Includes Retrospect backup software.	Slow. Meager software. Default format not ISO; Option-key sequence to format as ISO standard.	Very slow. Dynamic partitioning. Formats Ricoh (non-ISO) only, but ISO version now shipping.
Hardware				
Advertised megabytes, both sides	570 MB	650 MB (gigabyte w/ ZCAV†)	600 MB	600 MB
Formatted megabytes, one side	286.35 MB	287.4 MB (450 w/ ZCAV†)	284.59 MB	255.92 MB
OEM mechanism	Ricoh RO-5030E2 A	MaxOptix (Maxtor) D6	Ricoh RO-5030E2 A	Ricoh RO-5030E 1
SCSI-ID selector	ext. recessed push wheel	ext. rotary switch	ext. recessed push wheel	ext. DIP switches
SCSI termination	external	external	internal, with switch	external
Data standards				
Apple partition format*	*IMV5*	*IMV5*	*IMV5*	*IMV5*
Disc-sector sizes (bytes)	512 bytes	512/512-ZCAV†(gigabyte)	512 bytes	512 bytes
ISO-standard compliance (130mm)	yes	yes (650-MB disc only)	yes	no
Software				
Partitioning	no	yes	yes	yes
Backup	yes	yes	no	no
Password protection	no	yes	yes	no
Data encryption	no	no	no	no
Disc optimizer	no	no	no	no
Diagnostics	yes	no	no	no
Other				
Dimensions (L x W x H, inches)	11 x 10.25 x 3.75	14.5 x 7.5 x 5.5	9.75 x 10.5 x 4.0	13 x 9.25 x 5.5
Warranty	1 year	1 year	1 year	1 year
	Relax Technology 3101 Whipple Road, #22 Union City, CA 94587 (415) 471-6112	Storage Dimensions 2145 Hamilton Ave. San Jose, CA 95125 (408) 879-0300	Sumo Systems 1580 Old Oakland Road #C103 San Jose, CA 95131 (408) 453-5744	Xyxis Corp. 14631 Martin Drive Eden Prairie, MN 55344 (612) 949-2388

*Disc partitions are defined by specifications in *IMV5* (*Inside Macintosh, Volume 5*) or in the older *IMV4*.
†Zone Continuous Angular Velocity drives write increasingly more data on normally underutilized outer tracks.

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Your data is *your* data. And to keep it that way Kensington introduces PassProof™ — the first complete data protection system for the Macintosh®.

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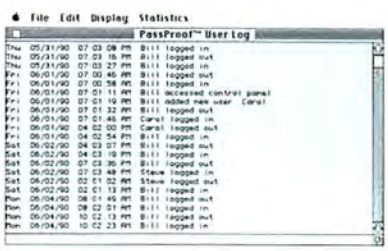

Want to "lock up" in a hurry? Quick Cover™ is PassProof's screen-locking program that lets you secure your Mac on command.

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Ask your dealer about other Kensington accessories including cable and lock systems for all Apple and Macintosh computers, including the Mac Portable and the LaserWriter® II. Or call for a free brochure at 800-535-4242. Outside the U.S., call 212-475-5200.

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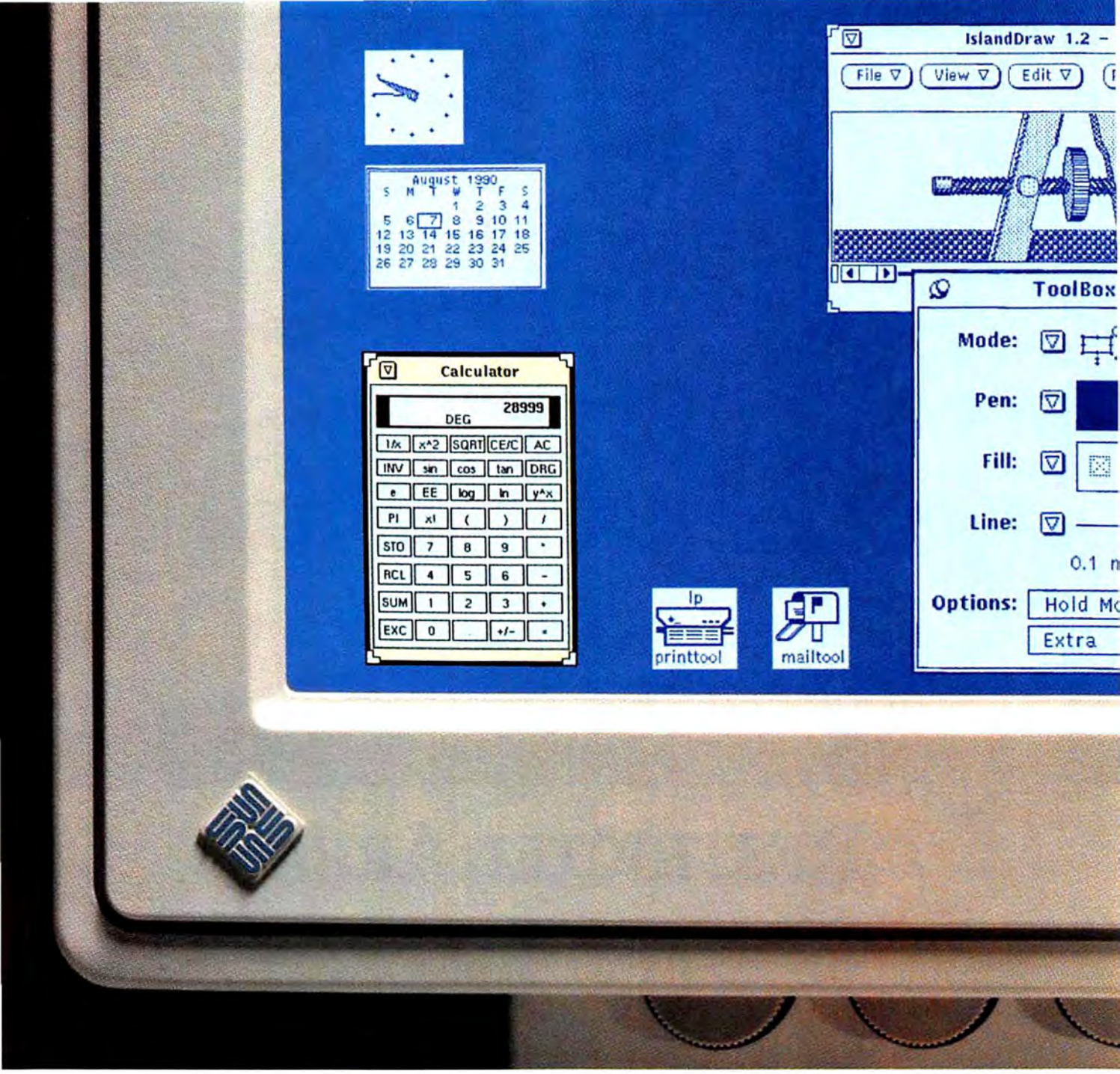

AUTOMATIC DEA

Remember all those PCs and Macs you got a couple years ago? And the way they were supposed to make you more productive?

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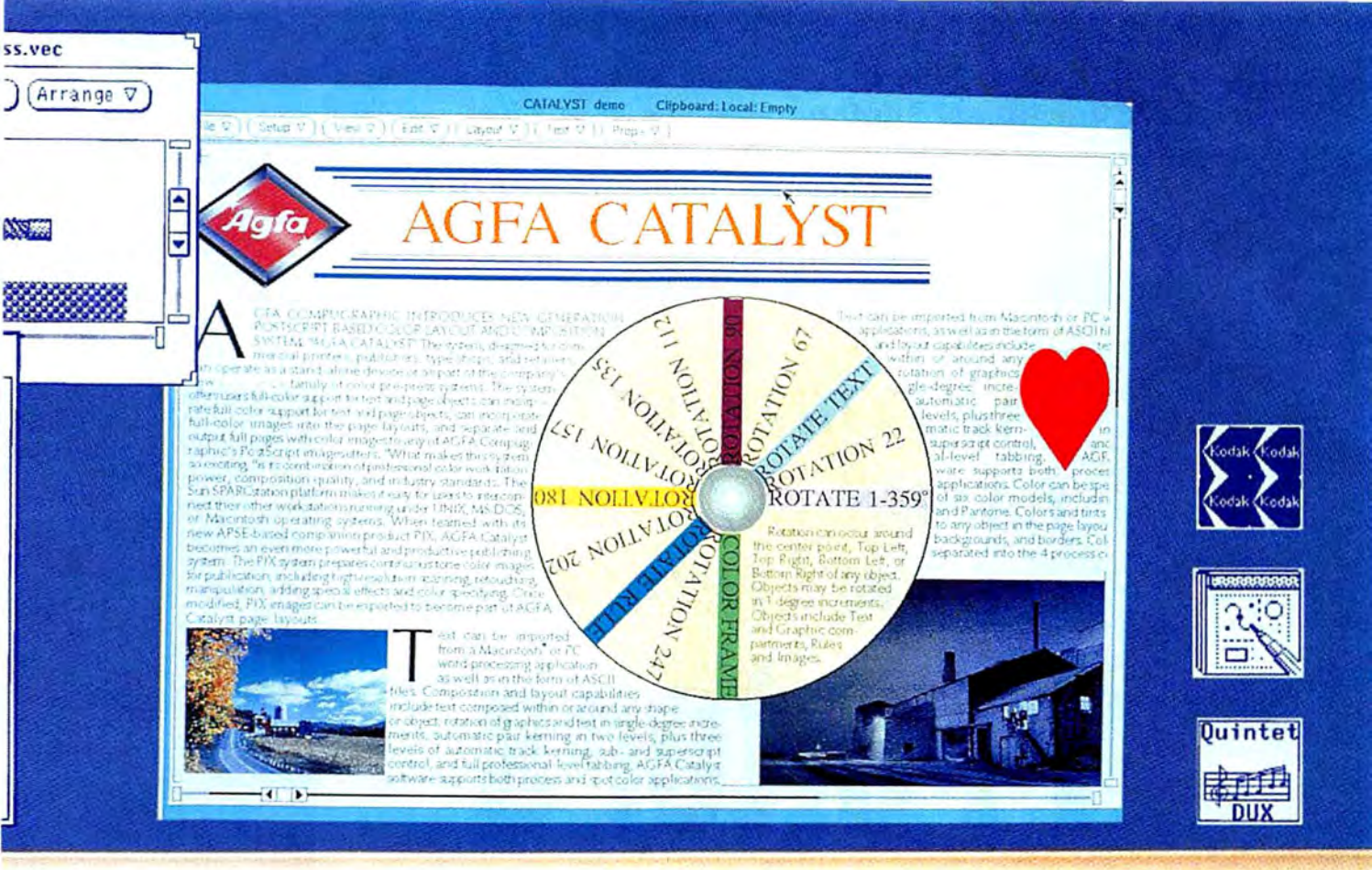

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can check the same files to see if everyone's on schedule.

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AFFORDABLE, LASER-QUALITY QUICKDRAW Printers

Three personal QuickDraw printers give great-looking output without breaking your budget.

BY KELLI WISETH AND THE MACUSER LABS STAFF

Three affordable QuickDraw printers (left to right): the Hewlett-Packard DeskWriter, the GCC PLP IIS, and the Apple Personal LaserWriter SC

You can't afford a LaserWriter, but your ImageWriter output no longer impresses your clients. You're tired of running out to the all-night copy center and paying a stranger to laser-print a confidential proposal. Not to worry. You have an alternative: a personal QuickDraw printer.

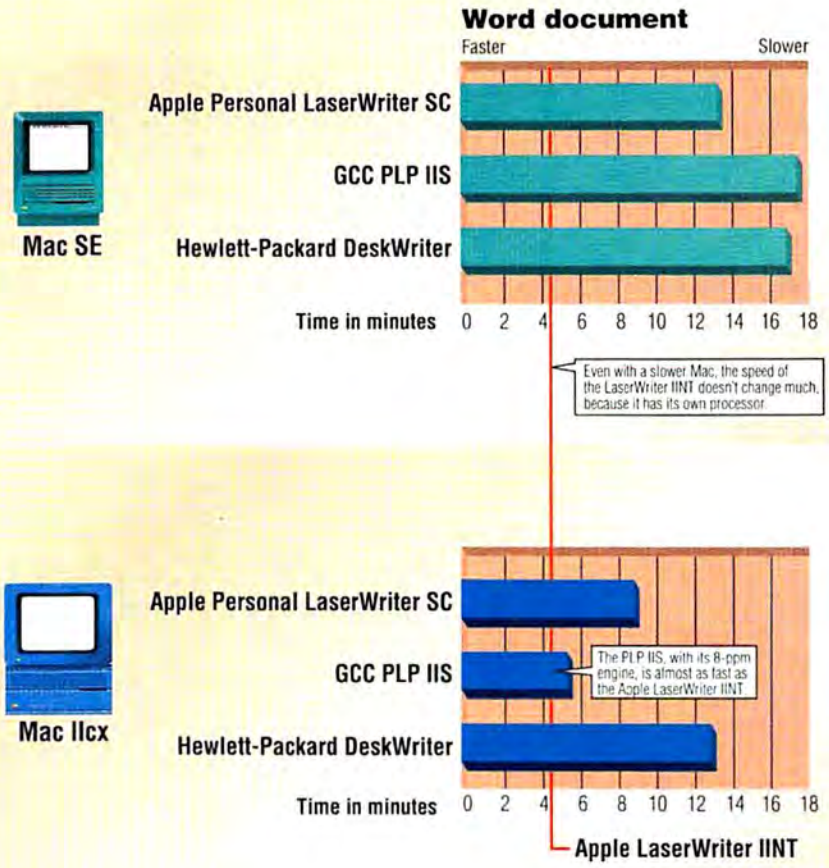
Laser-quality output is now affordable for small businesses and individuals of modest means. Even if all you have is a Mac SE perched on a workbench in your garage, here's a printing solution you can afford. Personal QuickDraw printers are, for the most part, designed for just one Mac and just one user — you — and are inexpensive enough for the noncorporate, non-volume-discount buyer.

QuickDraw printers are less expensive than their PostScript cousins for two major reasons. First, they avoid the hefty licensing fees required for Adobe PostScript. Second, they use the Mac to do the image processing usually done in the PostScript printer itself. You save money, but you lose the versatility of PostScript and the speed of in-printer processing.

G
A

Figure 1: Printing Speed

Figure 1: In most cases, our three QuickDraw printers were slower than our chosen PostScript standard, the Apple LaserWriter IINT. We printed a 25-page Microsoft Word file, a complex MacDraw page, and a PageMaker document, using a Mac IIcx and a Mac SE. The most striking difference in QuickDraw-printer speed is between Mac platforms: the more powerful the Mac, the faster the QuickDraw printer. By contrast, the Apple LaserWriter IINT, with its own PostScript interpreter and processor on-board, is relatively unaffected by the Mac.



MacUser Labs looked at three QuickDraw printers, each using a different printing technology. The Apple Personal LaserWriter SC ($1,999) is a true laser printer, whereas the GCC PLP IIS ($1,899) substitutes LEDs (light-emitting diodes) for laser light. The Hewlett-Packard DeskWriter ($995) uses inkjet technology. If these prices don't sound exactly cheap to you, make some phone calls and you'll discover that mail-order prices for the DeskWriter, for example, can be less than $800. Compare this price with that of the popular Apple LaserWriter IINT, which gives the same resolution for $4,499.

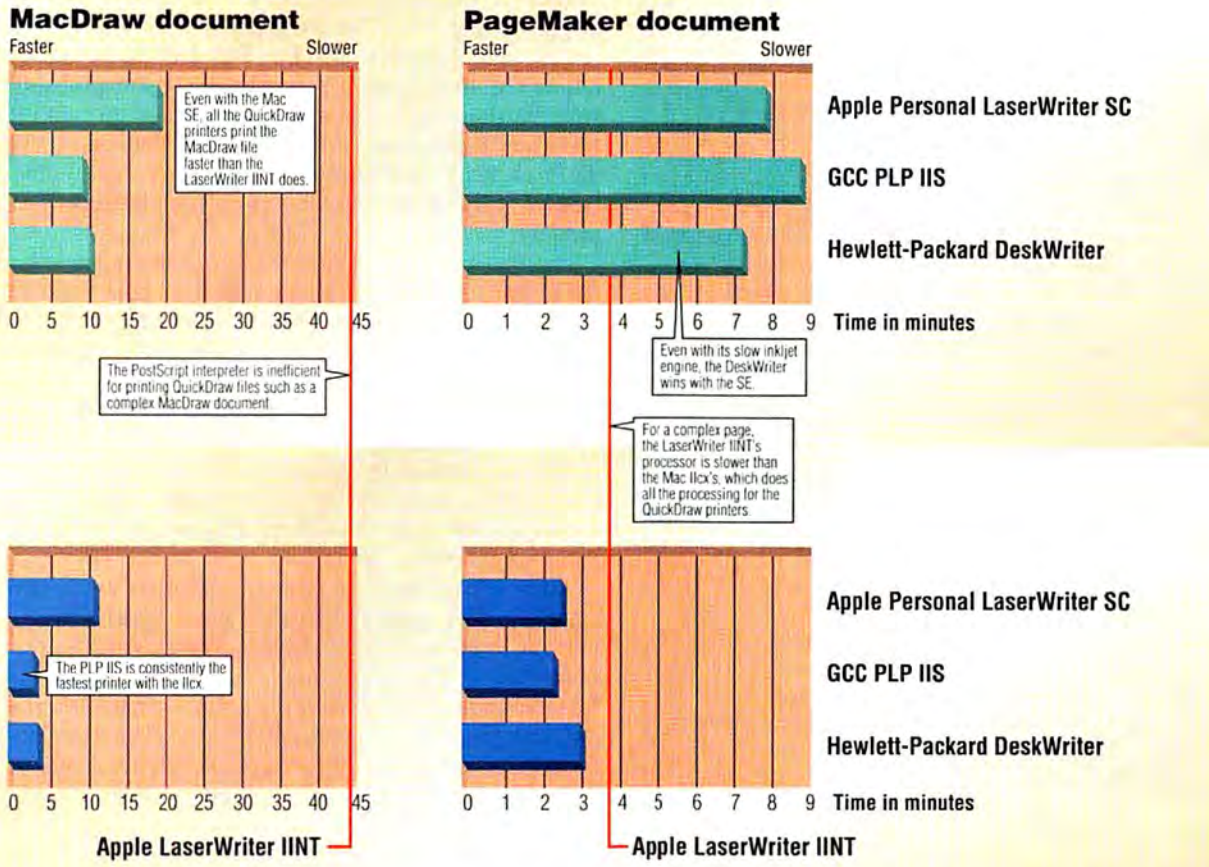
To test the performance of each of these low-cost printers, we created test pages with three popular applications: Microsoft Word 4.0, MacDraw II, and PageMaker 4.0. These real-world documents tested the two obvious things a potential buyer looks for in a printer: image quality and speed.

In addition to using MacUser Labs' standard testing platform — a Mac IIcx with 4 megabytes of RAM — we ran the same benchmarks using a Mac SE with 2.5 megabytes of RAM, because the SE is the Mac of choice for individuals and small businesses that aren't bankrolled by venture capitalists or Microsoft's Bill Gates. On both test Macs, we installed System 6.05 and ATM (Adobe Type Manager) 1.2, which uses outline-font technology to produce smooth fonts at any resolution for both screen and print. To see how the printers performed when using the same fonts, we used ATM rather than the outline fonts or bit-mapped fonts shipped with each printer.

You Get What You Pay For

Any QuickDraw printer relies on the Mac to process the image that will ultimately come out of the printer. This procedure is called RIPing (raster-image processing); the Mac *RIPs* the image. The speed of this process differs according to CPU power and memory.

A quick look at the results of our raw-speed tests (see Figure 1) illustrates one of the primary differences between QuickDraw printers and PostScript printers (or any other printers that do their own page processing). The PostScript interpreter in the LaserWriter IINT does the RIPing, so there is very little difference in times between printing



from an SE or a IIcx. But a QuickDraw printer performs much faster when attached to a IIcx rather than to an SE. Because the rasterizing occurs in the Mac's CPU, a more powerful processor and more RAM in the Mac give a clear speed advantage, as the chart comparing the two test Macs demonstrates.

QuickDraw is a set of graphics routines that resides in your Mac's ROM and System software. It's used by all Mac applications — even PostScript programs — to put images onto the screen. All these graphic operations take place in a drawing environment that QuickDraw calls a graphics port, or grafPort. For example, the windows that any application displays are grafPorts. A special printing grafPort is used for "drawing" to a printer.

How does the grafPort know what type of printer you're printing to? When you select a printer from the Chooser, you're selecting an active printer driver. Each QuickDraw printer driver takes the 72-dpi QuickDraw screen image and turns it into a printable 300-dpi bit-mapped image. This whole page is then sent to the printer. Because the PLP IIS and Personal LaserWriter SC each contain 1 megabyte of RAM, they can hold and then print about a page while another page is being processed back at the Mac. The DeskWriter's tiny 8K buffer isn't much help — although the DeskWriter is surprisingly speedy in some applications.

Easy Installation

The software setup is the same for each printer: Put the printer driver into the System Folder, install the fonts, select the printer from the Chooser, and print.

The DeskWriter offers a serial/LocalTalk connection and is the only printer in this class that can be shared on a network. Both the PLP IIS and the Personal LaserWriter SC connect to the Mac through the SCSI bus. The Personal LaserWriter SC has a second SCSI port and is not terminated. The PLP IIS has only a single SCSI port and is internally terminated, so it must be the last device in your SCSI chain. If you need to remove the internal termination, it's a simple matter of removing five screws from the printer casing, taking off a metal shield, and pulling the terminator. If you need more help, GCC's

System 7.0 and TrueType

Although it has become a rather tired refrain, System 7.0 is just around the corner. And with System 7.0 comes the eagerly awaited new font technology TrueType. If you drag a TrueType font icon into the System Folder — good-bye Font/DA Mover — TrueType will automatically create smooth screen fonts of any size. TrueType will also print smooth fonts on any QuickDraw printer.

ATM (Adobe Type Manager) was the precursor to Apple's TrueType technology. Adobe saw TrueType as a threat to its own font standard, Type 1 PostScript fonts, so it created ATM to make Type 1 fonts smooth on-screen and in print. ATM and TrueType differ in the fonts they use. ATM works only with Adobe Type 1 fonts, whereas TrueType works only with TrueType fonts — and the two font standards are not compatible. Applications that will convert one into the other will be available, but as of this writing, none are shipping (and neither is System 7.0).

When the new Macintosh operating system finally makes its way to Macintosh users, TrueType will be included as standard on every new Macintosh sold. ATM, on the other hand, currently lists for $99. Although Apple claims that TrueType fonts will print faster and look even better than fonts printed with ATM, ATM is here today — and it's working. Until we have TrueType in our Macintoshes, questions of performance and quality remain unanswered.

So which font technology should you go with? If you already have an Adobe font library, you would do better to use ATM. You don't need to purchase new TrueType fonts, and you'll remain upwardly compatible with printers that already use Adobe fonts. If you want seamless integration with System 7.0, wait for TrueType.

— Paul Yi

tech-support staff can assist you over the phone.

The setup of the toner and ink elements are more of a mixed bag, with the PLP IIS presenting the biggest challenge. Emphatic cautionary notes throughout its documentation warn that even dim light can ruin the EP (electrophotographic) cartridge. But don't worry about reflections from your pearly whites — you probably won't be doing a lot of smiling when you set up the PLP IIS. The EP and toner cartridges are separate units, and the fuser cleaner pad slips over them. Not terribly complicated, but Byzantine when compared with the other two printers.

The Personal LaserWriter SC, for example, includes the toner and drum in a single unit that snaps into the printer. A particularly nice feature is a shutter-type enclosure that shields the light-sensitive drum when you open the printer case.

Setup for the DeskWriter is the simplest of all: Just pull the small inkjet cartridge out of its container, and drop it into its slot in the DeskWriter. That's it. Done. And when the cartridge runs dry, you can simply replace it or recharge it by using the $10 refill kit offered by JetFill America of Austin, Texas.

After setting up your printer, turn it on and listen carefully: The personal nature of these printers makes noise an important factor. The DeskWriter is the quietest of the three. In fact, it's so quiet — a slight whoosh as the inkjet print head passes over the paper — that when it's not printing, you may forget it's on. The Personal LaserWriter SC is slightly noisier than the DeskWriter. The only noise you hear is a constant low hum.

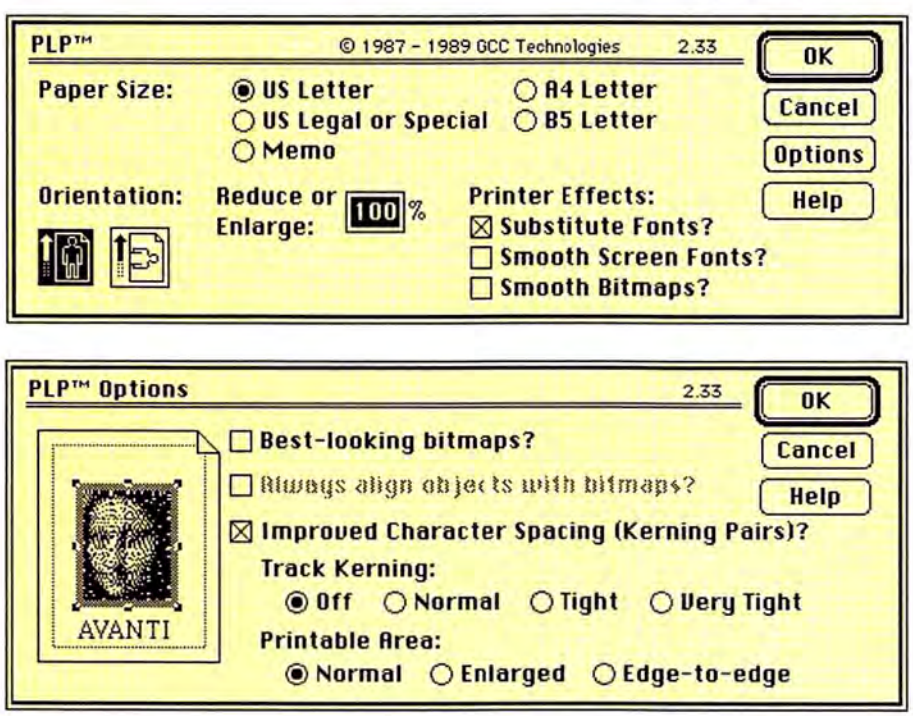


Figure 2: The PLP IIS provides more-powerful driver software than the other two QuickDraw printers do. Choosing Options in the Page Setup dialog box lets you control type kerning and print area, two features exclusive to the PLP IIS.

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*IID duplexing feature not supported in PostScript mode.

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The PLP IIS, on the other hand, makes a revving noise when it prints, reminiscent of a Lear jet taking off in the distance. On the plus side, you can set your PLP IIS to "sleep" for 2, 4, 6, or 8 minutes after it finishes printing. The revving sound — the sound of the drum turning — stops, but you have to wait for the PLP IIS to warm up before it will print again. We recommend that you put the PLP IIS to sleep. In the roar of the MacUser Labs, with disk drives whirring and printers shooting out pages of Pulitzer-prize-winning copy, the rev isn't so loud. But in less hectic environments, it can be annoying.

Fonts and Other Goodies

Although our tests used ATM to maintain type consistency, both the DeskWriter and the PLP IIS come with their own outline fonts. The DeskWriter includes 22 fonts from Compugraphic, and the PLP IIS has 13 from Bitstream. The Personal LaserWriter SC does not include outline fonts. Instead, it uses a "4x" screen-font scheme — for best results, you need to install both the size you want — say, 10 point — and also the screen font that's four times that size (40 point). It's the larger font size, scaled, that's used to create the 300-dpi bit map for printing. However, adding multiple sizes of screen fonts can take up memory on your hard disk. The release of System 7.0 will help, because the new TrueType font-outline technology (see the "System 7.0 and TrueType" sidebar) will allow the Personal LaserWriter SC and any other QuickDraw printer to do away with bit-mapped screen fonts altogether.

Besides including outline fonts, the PLP IIS comes bundled with two utility programs: a $49 envelope-printing DA called QuickEnvelope and an application called GCC Print Manager that's designed to let you print a file after it's been RIPed. The PLP IIS also has the most impressive driver software (see Figure 2). In addition, GCC offers a $29 utility to convert Bitstream MacFont-Ware fonts into outline fonts for use on any of its printers. Both the Personal LaserWriter SC and the DeskWriter work with SuperLaserSpool 2.02.

Performance

Our speed-test documents consisted of a 25-page Microsoft Word 4.0 document, a 1-page MacDraw II document, and a 1-page PageMaker document with everything in it but the kitchen sink. We included a gray-scale TIFF file, a half-tone TIFF, tons of text, and a gray ramp (clearly a case for the Design Police). We also tested an Excel document but didn't include the results here because of an anomaly with the PLP IIS: It added two extra pages to our 10-page spreadsheet. It wasn't clear whether the problem had to do with GCC's driver or with the way Excel interfaced with it. We contacted GCC, and the company's now working on the problem with Microsoft.

For printing, the PLP IIS has the fastest engine speed, rated at 8 ppm (pages per minute). With a Mac IIcx, the $1,899 PLP IIS even approaches the text-printing speed of the $4,499 LaserWriter IINT. The 4-ppm engine of the Personal LaserWriter SC and the slow inkjet engine of the DeskWriter lag far behind. But on the other tests — especially on the Mac SE — the results are less intuitive, because the speed of a QuickDraw printer depends so much on the Mac model.

When you compare the IIcx and SE results for the QuickDraw printers, the numbers say, "Use a faster Mac." The PageMaker test produced the most dramatic slowdown: Both the PLP IIS and the Personal LaserWriter SC took more than 3 times as long to print from the SE than they did from the IIcx. The superior performance of the DeskWriter is puzzling, because the PLP IIS and the Personal LaserWriter SC each have 1 megabyte of RAM that can hold a page in memory until another page finishes being printed, whereas the DeskWriter relies entirely on the Mac for both memory and RIPing. Yet, in the case of the PageMaker document, the DeskWriter printing from the SE did the best of the three in terms of both raw speed and slowdown — it took just over 7 minutes, which was only 2.4 times as long as from the IIcx.

What's the explanation? Printing is a synergistic operation involving three primary factors: the algorithms of the print driver; the transmission rate of data to the printer (SCSI versus LocalTalk); and finally, the mechanical limitations of the print engine. Our technicians are still trying to crack this conundrum.

The Jury's Verdict

The PageMaker 4.0 test page — printed on high-quality Strathmore Legacy paper so that each printer could make its best impression — also served as the print

Figure 3: Image Quality

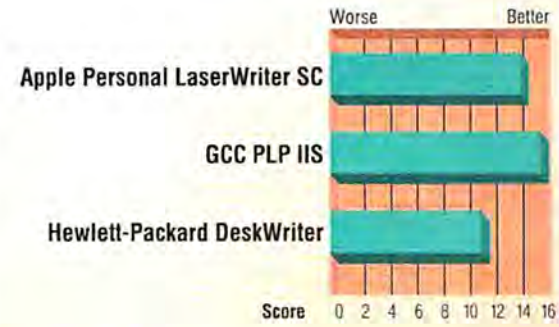
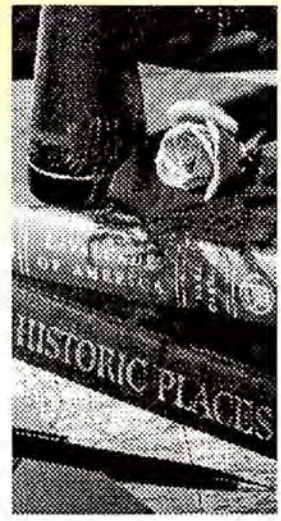


Figure 3: We printed a PageMaker document filled with complex graphics and varying sizes of text to see how the output from the printers compared. When we showed the results to our jury, the GCC PLP IIS was the clear favorite. The Apple Personal LaserWriter SC came in a close second, and the Hewlett-Packard DeskWriter was last.

Figure 4: Gray-Scale Image

Hewlett-Packard DeskWriter

GCC PLP IIS



Apple Personal LaserWriter SC

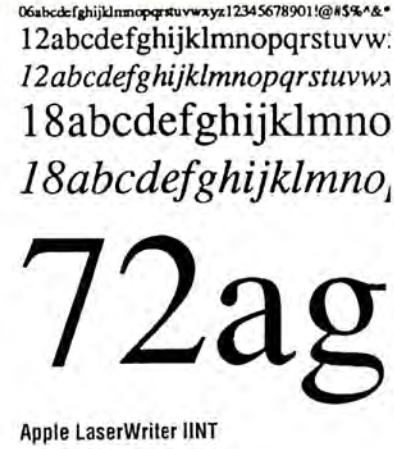
Figure 4: We included a scanned picture in our test page to assess image quality. The DeskWriter did a disappointing job on the gray-scale image, producing muddy-looking output, whereas the outputs from the PLP IIS and Personal LaserWriter SC's were sharp and detailed. The toner-based engines of the latter two printers are better than the inkjet engine for pages filled with graphics.

Figure 5: Text Quality

Apple Personal LaserWriter SC

GCC PLP IIS

Hewlett-Packard DeskWriter



Apple LaserWriter IINT

Figure 5: We used Adobe Times in varying point sizes to test text quality. PostScript printers such as the Apple LaserWriter IINT have fonts built in to their hardware, but QuickDraw printers must rely on the Mac to produce high-quality fonts. Now, thanks to ATM, QuickDraw printers can produce text at any size that rivals the quality of that produced by PostScript printers. Even the DeskWriter, with its inkjet engine, prints clear, legible text. Again, the PLP IIS produces the cleanest characters.

sample we showed to our jury of seasoned printer professionals. The GCC PLP IIS came in first in every category (see Figure 3). The output looked sharp, with little clumping or spreading of toner. The PLP IIS uses an LED printing engine that operates in much the same way as the Personal LaserWriter SC's laser, except that instead of the latter's single laser beam of light bouncing off a whirling mirror, it has a 300-dpi LED array that exposes a revolving light-sensitive drum. The LED engine produced crisper halftones and finer lines than did both the Personal LaserWriter SC and the DeskWriter printers (see Figure 4).

The second-place Personal LaserWriter SC is a true laser printer, using laser light, electrical charges, and toner. But our jurors found that the output sometimes appeared more clumped than the output from the PLP's LED engine.

The inexpensive DeskWriter came in last place in the image-quality category. The DeskWriter is an inkjet printer, in which a print head is drawn back and forth, as with a dot-matrix printer, while a minuscule stream of ink jets onto the paper. One of the drawbacks of an inkjet printer is that if you have a page loaded with graphics or solids, the paper comes out soaking wet — exactly what happened to our test page. If you want to use this printer for a lot of dense graphics and solids, you should spend some time searching for a paper that will give you the best results. An absorbent paper with a high cotton-fiber content seems to reduce wet-paper curl, but the trade-off is that type is slightly less sharp. When you want to print pages that contain nothing but plain text, however, the DeskWriter does an impressive job for its price (see Figure 5).

High Quality, Low Price

For the right job, these printers are certainly priced right. For simple text and graphics output, their quality rivals that of higher-priced PostScript printers. (In fact, you can upgrade both the Apple Personal LaserWriter SC and the GCC PLP IIS to PostScript machines.) As always, you have to find a balance between your wants, your needs, and your disposable income. When you've figured out this equation, it will be easier to choose the right printer from our recommendations in "The Bottom Line."

Kelli Wiseth is a free-lance writer and editor who ran a printing press in the early 80s.

The Bottom Line

If you can do without the versatility and graphics capability of PostScript printing, a QuickDraw printer may meet your needs. It can give you laser-quality output at a bargain price. For overall speed and image quality, we recommend the **GCC PLP IIS** ($1,899). It's sturdily built: During its advertised lifetime, it can print three times as many pages as the **Hewlett-Packard DeskWriter** ($995) can. One drawback of the PLP IIS is its noisy operation, but its clever Sleep mode mitigates this annoyance. Its setup is more of a challenge than that of the other two printers, but read the instructions thoroughly, dim the lights, and then just do it — all the cautionary notes in the manual are probably a little overstated.

If the price of the PLP IIS takes you aback, consider its less expensive sibling, the PLP II ($1,399). It's the identical printer but with a slower 4-ppm engine. And if you decide that you want added graphics abilities, you can upgrade the PLP IIS to the true-Adobe PostScript GCC BLP IIS for $999. (The PLP II can become a PostScript BLP II for the same price.)

The **Apple Personal LaserWriter SC** ($1,999) is also hard not to like. But it's still slower than the PLP IIS, and its print output is not as crisp. On the plus side, its Canon toner and shutter-protected drum assembly are a feat of engineering wizardry. The setup is extremely neat and clean for a toner-based printer. The manual has Apple's usual designer look, but on further inspection, it's downright disappointing. We couldn't even find such basic information as minimum hardware and System-software requirements. Both the GCC and the Hewlett-Packard manuals are more informative. You can add PostScript to the Personal LaserWriter SC with a $1,300 Personal LaserWriter IINT board upgrade.

The DeskWriter's inkjet technology can't compete with the toner-based system of the other two printers. Nonetheless, it is an attractive buy for the right Mac user. It's lightweight and compact, and if you print only a few letters a day, the DeskWriter's price/performance ratio is unbeatable. Also, for those with Mac SEs and Pluses, the DeskWriter's performance is on a par with that of the other two printers. The DeskWriter manual devotes an entire chapter to maximizing printer performance, getting into the nitty-gritty of defragmenting your hard disk, defragmenting system memory, and so on. Hewlett-Packard's done a great job of turning the manual into a tutorial, with cross-references to the Macintosh System-software manual.

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Table 1: Features of QuickDraw Printers

	Apple Personal LaserWriter SC ★★★★	GCC PLP IIS ★★★★½	Hewlett-Packard DeskWriter ★★★½
List price	$1,999	$1,899	$995
Comments	Easy-to-use, well-designed toner cartridge. Needs System 7.0 or ATM for smooth fonts. Can be upgraded to PostScript.	Fastest printer. Best image quality. Nice bundled software and outline fonts. Can be upgraded to PostScript.	Compact design. Extremely quiet. Inkjet quality not up to par with laser or LED. For plain text, price is unbeatable.
Hardware			
RAM (megabytes)	1 MB	1 MB	0 (8K buffer)
Engine, type	Canon LBP-LX, laser	Okidata 400, LED	Hewlett-Packard, thermal inkjet
Engine speed (pages/minute)	4 ppm	8 ppm	1 ppm
Engine life (pages)	150,000	180,000	60,000 (50 pages/day, max.)
Monthly duty cycle (pages)	3,000	3,000	600
Resolution	300 dpi	75, 150, 300 dpi	150, 300 dpi
Minimum Mac	Mac Plus, 1 megabyte RAM	Mac Plus, 1 megabyte RAM, hard-disk drive	Mac Plus, 1 megabyte RAM, hard-disk drive
Minimum System	System 5.0 or later	System 6.0 or later	System 4.1 or later
Interfaces	SCSI	SCSI	LocalTalk/serial
Network support	no	no	yes
Print-spooler support	SuperLaserSpool	GCC Print Manager	SuperLaserSpool
Software			
Outline fonts	none	Bitstream (22 fonts in 6 families)	Agfa Compugraphic (13 fonts in 4 families)
Additional software	none	GCC Print Manager and QuickEnvelope	none
Paper handling			
Paper output (image up, down)	selectable	selectable	up
Paper stock	16 – 28 lb	16 – 24 lb (auto-feed) 16 – 34 lb (manual feed)	16 – 24 lb
Labels, transparencies	yes	yes	no
Number of trays	2	1	1
Tray capacity (pages)	standard tray, 250 multipurpose tray, 50	200	100
Paper sizes	letter, legal, A4, B5, envelopes	letter, legal, A4, B5, envelopes	letter, legal, A4, envelopes
PostScript upgrade	upgrade to IINT, $1,300	upgrade to BLP IIS, $999	none
Supplies			
Toner	$99 (3,500 pages)	$33 (2,500 pages)	NA
Drum	NA	$289 (15,000 – 20,000 pages)	NA
Inkjet cartridge	NA	NA	$19.95 (250 – 300 pages)
Other			
Dimensions (W x D x H, in.)	15 x 18.3 x 9.8	17.7 x 17.7 x 5.25	17.3 x 14.8 x 8
Weight	32 lb	24 lb	14.3 lb
Warranty	1 year	1 year	1 year
	Apple Computer, Inc. 20525 Mariani Ave. Cupertino, CA 95014 (408) 996-1010	GCC Technologies 580 Winter St. Waltham, MA 02154 (800) 422-7777	Hewlett-Packard 19310 Pruneridge Ave. Cupertino, CA 95014 (415) 857-1501 (800) 752-0900

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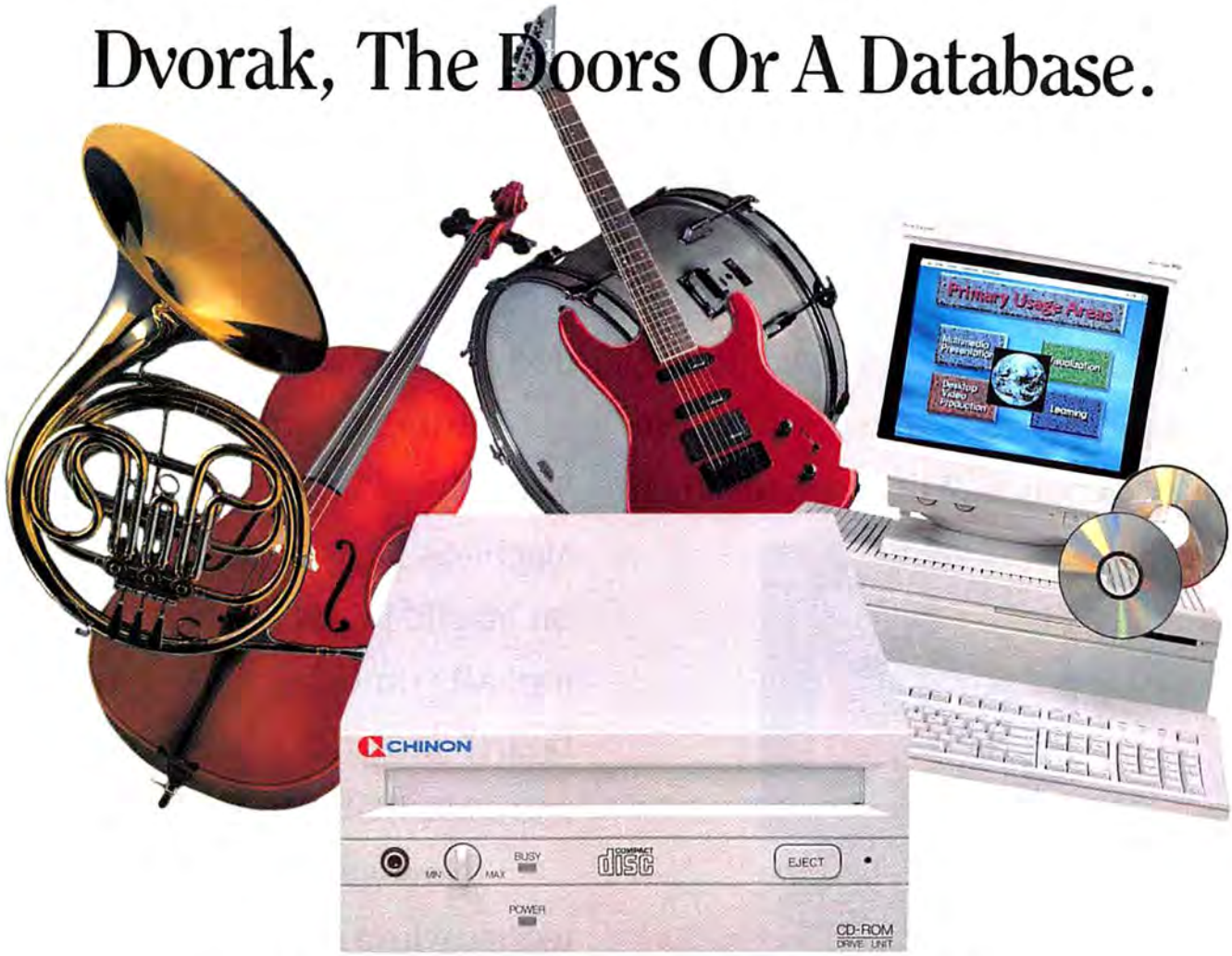

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By Minna Levine and Linda Custer

ON BEYOND
SPREADSHEETS

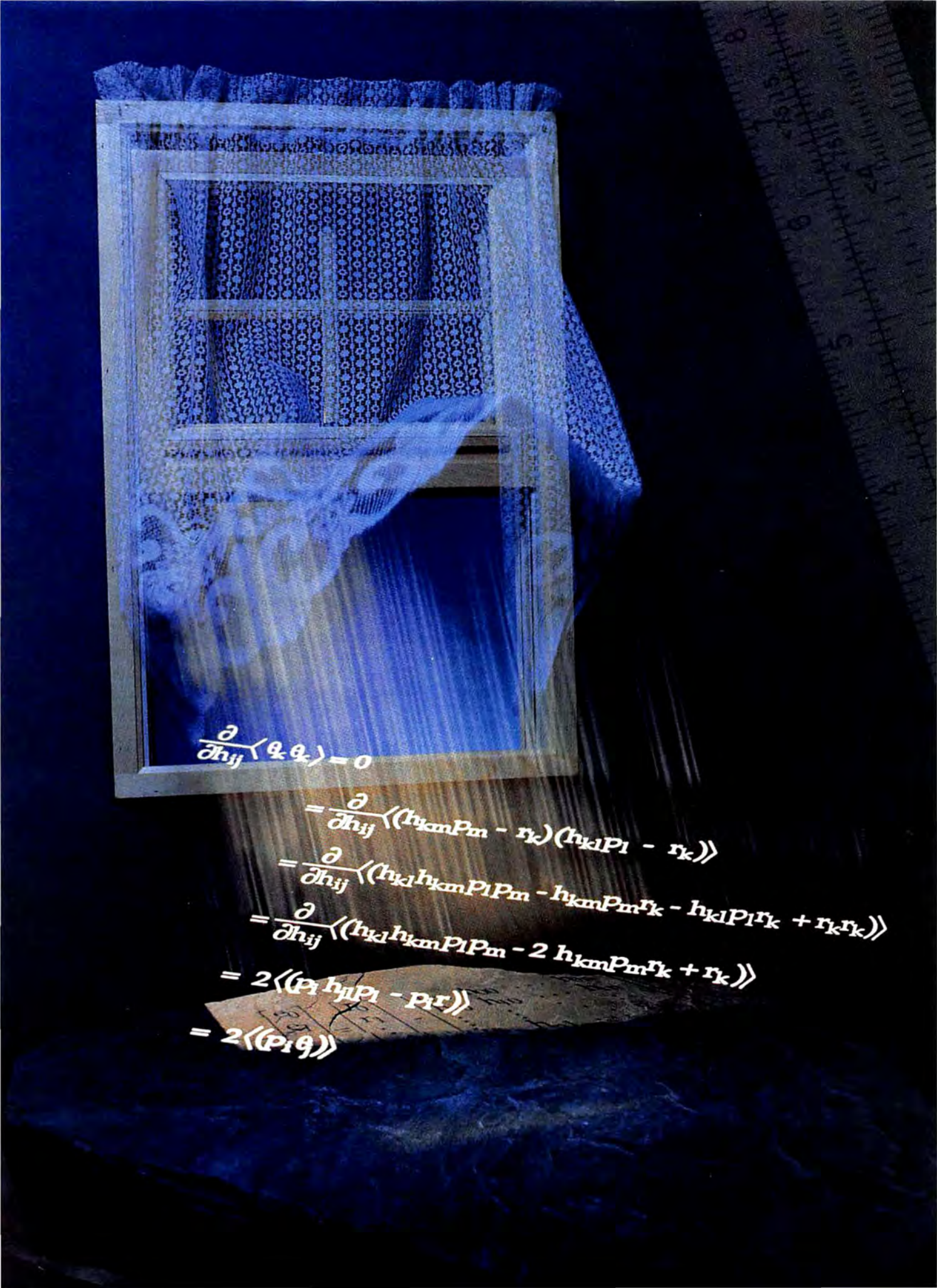
Sophisticated math programs are making the Mac an elegant tool for heavy-duty number crunching.

Say "number crunching," and the word *spreadsheet* comes to mind. But even though Excel has a dozen functions you'll never use, spreadsheet programs can't do everything. For complex science and mathematics, a specialized program fills the bill much better. To prepare this article, we examined some of the most powerful number-crunching Mac programs on the market. Regardless of your profession or application, there's probably a Mac math program for you.

For those who are content to chart data only after it has been thoroughly crunched, we review three brand-new high-end statistics packages that bring the power of numeric-trend analysis to your desktop. The second part of our report compares programs for visualizing and solving equations, including the top two contenders, Mathematica and Theorist. The two differ greatly in the approach they take and have other important differences too. We tell you when and for whom each program is best.

And finally, we look at a few of the products available for visualizing data. The Mac is an ideal platform for turning a pile of data into a meaningful picture that's worth at least a thousand digits. Just be careful. After seeing these programs, you may never want to go back to your spreadsheets again.

PHOTOGRAPHY TOM LIPTON


$\frac{\partial}{\partial h_{ij}}\langle \theta_k \theta_k \rangle = 0$
$= \frac{\partial}{\partial h_{ij}}\langle (h_{klm}p_m - r_k)(h_{kl}p_l - r_k) \rangle$
$= \frac{\partial}{\partial h_{ij}}\langle (h_{kl}h_{klm}p_l p_m - h_{klm}p_m r_k - h_{kl}p_l r_k + r_k r_k) \rangle$
$= \frac{\partial}{\partial h_{ij}}\langle (h_{kl}h_{klm}p_l p_m - 2\, h_{klm}p_m r_k + r_k) \rangle$
$= 2\langle (p_l h_{jl}p_l - p_l r) \rangle$
$= 2\langle (p_l \theta_j) \rangle$

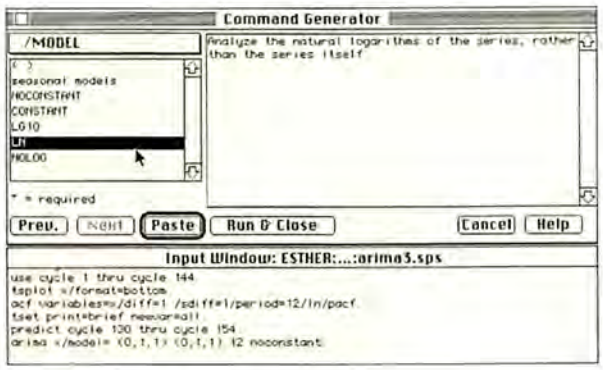


Figure 1: You can use the SPSS Command Generator to construct commands for any analysis. A help window provides information and definitions.

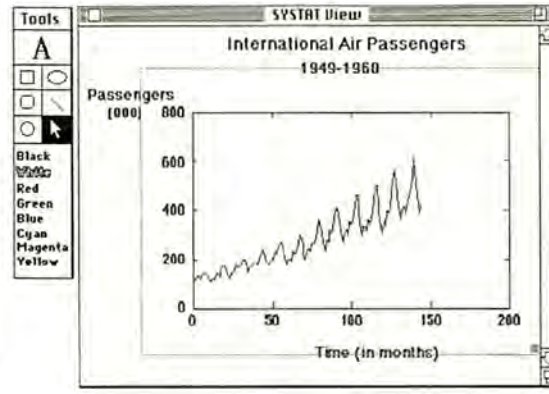


Figure 2: Although its default charts are tiny and unattractive, SYSTAT has graphics tools that make it possible to create an attractive presentation.

Statistics Powerhouses

Until recently, there were several sophisticated statistical procedures that you just couldn't perform on a Mac. Now, though, three powerhouse statistical packages for the Mac — Minitab 6.2, SPSS for the Macintosh 4.0, and SYSTAT 5.0 — have changed that. The advent of these high-end packages has made the Mac a creditable choice for sophisticated statistical work.

These applications do the basics, but they do them more comprehensively than do their journeyman counterparts Data Desk 3.0, Exstatix, JMP, and StatView (see "Business Statistics," April '90, page 114). Minitab, SPSS, and SYSTAT also offer several complex statistical procedures, flexible data-file importing, and the ability to perform batch processing. All this power can be expensive — these applications range in price from $695 for Minitab to nearly $2,500 for SPSS with all four of its additional modules. In comparison, the journeyman packages range from around $350 to $700.

So how do the high-end packages rate? To analyze the differences among Minitab, SPSS, and SYSTAT, we compared their graphics capabilities and available procedures and tested their speed.

User Interface

Don't expect a pure, Mac-like interface from any of these programs. All were originally developed for the DOS and mainframe markets; as a result, they retain at least some elements of a command-driven interface.

SYSTAT 5.0 provides a more Mac-like interface than do Minitab, SPSS, or its own previous versions. It features pull-down, tear-off hierarchical menus, and you can specify most procedures by using menu selections and dialog boxes. The command language is still available, however, and it can be useful in situations such as batch processing.

Minitab and SPSS are basically command-driven packages. They both have pull-down menus for manipulating windows, importing, saving, and printing, but otherwise they're nearly identical to their PC counterparts. SPSS is easier to use than Minitab: It has a Command Input window and a hierarchical menu system called the Command Generator, which lets you select and paste commands from a menu so you don't need to remember a long list of commands (see Figure 1). This isn't the same as using a true Mac-like graphical interface, however. You select commands in the same way as with a text-based word processor — individually or as an entire batch process — and then submit them.

Both Minitab and SPSS offer portability between the Mac and other systems. Programs for other machines (VAX, PC) written in these two applications' internal command languages work with minimal or no changes on the Mac. PC SYSTAT command files work on the Mac as well.

Procedures Available

If you're looking for sophisticated multivariate analyses, you've come to the right place. Table 1 shows which functions are available in each package. SPSS has the most procedures and options overall, but not all of them come as part of the basic package: Four optional modules, costing $395 each, cover time-series analysis, tabling, conjoint and correspondence analysis, and other advanced statistics. Not surprisingly, SPSS, counting its modules, is the most expensive of the three applications.

SYSTAT has the most procedures in its base package, and you can buy four additional modules: Design, which estimates sample sizes; Logit, for logistic regression; Probit, for estimating a multiple-regression model or analysis of covariance (ANOVA); and Testat, which provides test-summary statistics and reliability coefficients. Each of these supplements costs $110.

Minitab has the fewest procedures and options within procedures, and it doesn't have add-on modules, although macros are available from its maker to perform some additional functions. The main procedures in Minitab that are not in Data Desk 3.0, JMP, and StatView are time

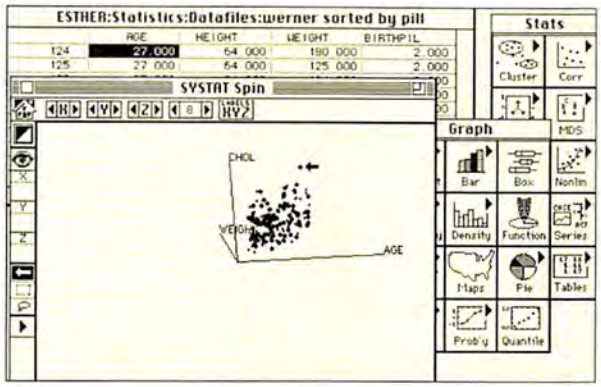


Figure 3: SYSTAT offers a rotating 3-D scatterplot. Three tools (on the lower left) locate and select points to investigate further. Note the tear-off Stats and Graph menus.

series, principal components, and discriminant analysis; if you don't need any of these procedures, you should select one of the other three packages, which have better charts and exploratory-data-analysis procedures.

Graphics Tools

The charts available in these packages differ in range, quality, and flexibility. Overall, SYSTAT is the most flexible program for graphical representation of numerical data (see Figure 2). It's the only program whose basic package provides the capability to create color charts, and it has the most-comprehensive procedures for data exploration. SYSTAT features some unusual displays, such as mapping, polar graphs, contours, and 3-D scatterplots, as well as more-traditional ones. Drawing tools are available for dressing up any plot and changing the font of axis labels and titles (see Figure 3). SYSTAT's interactive exploratory chart tools (3-D rotating plots, brushing, and slicing, for example) aren't available in SPSS and Minitab.

SPSS' graphics displays are available in low-resolution mode only, although the package provides an interface to Computer Associate's Cricket Graph, so you can create high-quality scatterplots and charts. CA-Cricket Graph lets you add color to your graphs and plots, but it cannot create 3-D scatterplots or contour plots.

Minitab produces most of its analytical charts in the Output window in low-resolution mode. You can create traditional scatterplots and bar and pie charts with high-resolution in separate graphics windows, but you can't edit or include titles in these charts. Color is not available.

Memory and Hardware Requirements

Minitab, SPSS, and SYSTAT differ vastly in terms of their memory and hardware requirements. Minitab requires the least hard-disk space (2.5 megabytes) and can run in only 1 megabyte of RAM. SPSS needs plenty of hard-disk space (ranging from 6 to 15 megabytes), depending on how many modules you install, and at least 2 megabytes of RAM.

Figure 4: Speed Tests

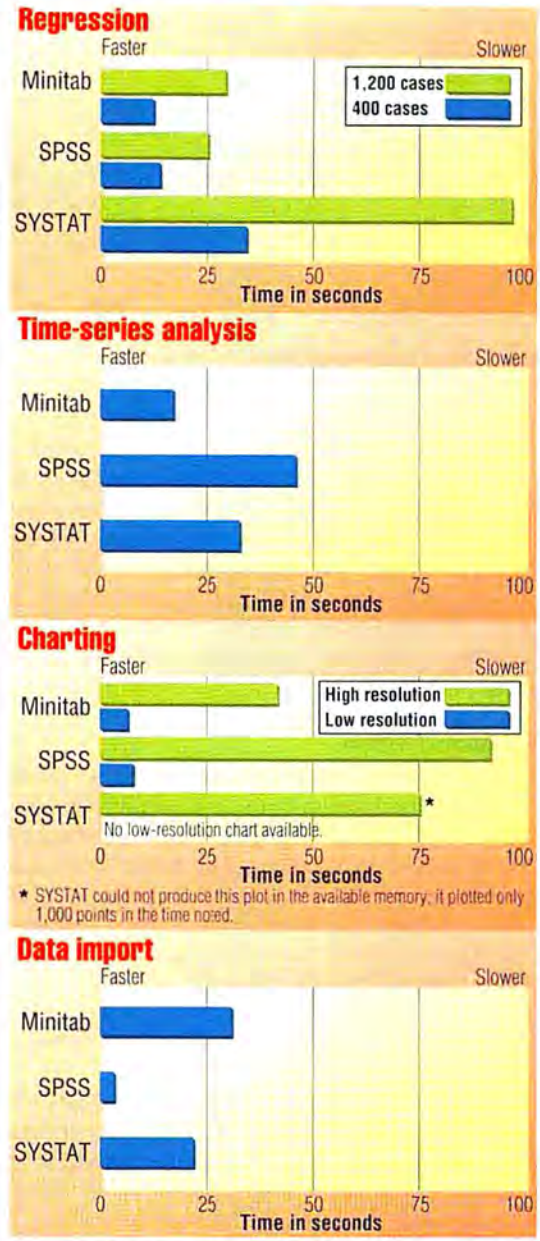


Figure 4: We tested each application's speed by performing four common operations on a Mac SE/30 with 4 megabytes of RAM running under MultiFinder. The regression times include computing and saving residuals for sets of 400 and 1,200 cases. The time-series-analysis times include ARIMA modeling and ACF and PACF plots. Forecasts were both computed and saved. The charting times compare how the programs performed when creating low- and high-resolution scatterplots. The SPSS times include the time needed to transport the data to CA-Cricket Graph. The data-import times compare how long it took each application to import a tab-delimited ASCII file containing 400 cases.

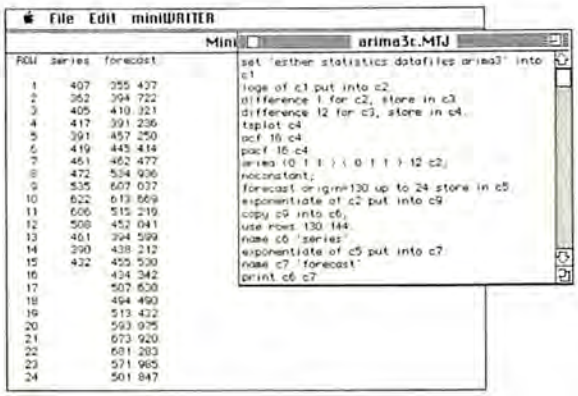


Figure 5: Minitab includes miniWRITER — a text-editor DA — for editing a command series that can be submitted as a whole.

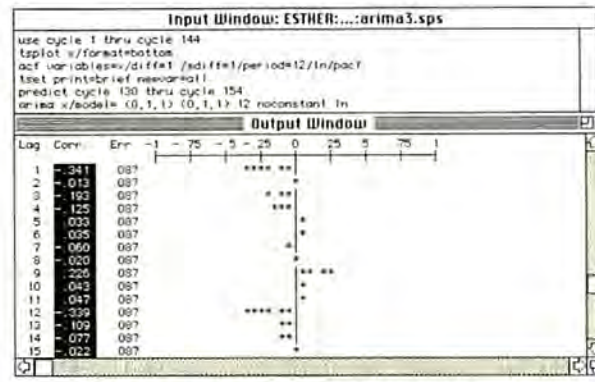


Figure 6: You type commands into SPSS' text-editor Input window and then issue them. SPSS displays results in an Output window, which has several handy editing capabilities, including cutting and pasting columns of numbers.

SYSTAT needs very little hard-disk space (only 3 to 4 megabytes), but it eats up RAM. The minimum requirement is listed as 4 megabytes, and this is truly a minimum. We couldn't perform all the plots and analyses for this article on an SE/30 with 4 megabytes, and we couldn't use other applications under MultiFinder at the same time. As this article went to press, SYSTAT announced a 2-megabyte version of SYSTAT 5.0 that should alleviate these problems.

Processing Speed

To test these programs' processing speed, we used the same tests we used to rate Data Desk 3.0, Exstatix, JMP, and StatView in last April's review. Using a Mac SE/30 with 4 megabytes of RAM running under MultiFinder, we tested each application's speed by performing four common operations: regression (including computing and saving residuals), time-series analysis (ARIMA modeling and ACF and PACF plots), charting low- and high-resolution scatterplots, and importing a tab-delimited ASCII file containing 400 cases. Figure 4 shows the results.

If you're looking for speed, SPSS and Minitab are the fastest, although Minitab is slow at data importing. In almost all our tests, SYSTAT brings up the rear. It's not only slower than Minitab and SPSS, but in many cases, it's slower than other statistical packages for the Mac. It's important to note, however, that we tested the 4-megabyte version of SYSTAT 5.0; the slimmed-down 2-megabyte version is much less memory-intensive.

Unique Features

Each of these programs has its own unique qualities; you have to look at them individually to get the full picture.

Minitab 6.2. Minitab is much leaner than the other two packages in terms of procedural availability, charting capabilities, and interface design, but don't be deceived by its Spartan character. Its command language is easy to learn, even for someone who comes solely from a Mac background, and it can be fast for running analyses. You can edit a command-procedure file with miniWRITER (see Figure 5), a text-editor DA that comes with Minitab. A nice feature is the ability to build and nest macros to automate complicated analyses.

Minitab also handles data well. You can easily create, manipulate, and save variables (such as residuals) in regression analyses with easy-to-learn commands such as "PUT RESIDS INTO C3."

This package would be much easier to use if its skimpy manual and on-line help were beefed up. Both of these need more general statistics information, more explanations about procedural options, and more examples. The manual clearly explains commands for common analyses, but commands for more esoteric ones (such as the ARIMA model, described in the "Time-Series Analysis" sidebar) are harder to figure out.

Minitab may well be your best choice if you need quick answers to research questions and you have other applications for doing your presentation graphics.

SPSS for the Macintosh 4.0. With its many modules, SPSS provides most procedures that professional analysts need. You pay for this wide range of procedures, however, in both software costs and disk space.

SPSS has many features — such as excellent on-line help, the useful Command Generator, and clear documentation — that make its non-Mac interface easier to use.

Although you can't change the font size and style in SPSS' Output window, you can edit text to include comments, remove items, or relabel output tables. A handy rectangular editing tool in this window enables columnar cutting and pasting (see Figure 6).

Graphically, SPSS has some flaws. Linking SPSS to CA-Cricket Graph for high-resolution charting is indirect and limited by CA-Cricket Graph's somewhat narrow options. To generate a CA-Cricket Graph file, you have to submit the CRICKET command in SPSS with a list of

Visual Data Analysis: Not Just a Pretty Face

Scientists and engineers at large research facilities have incredible computer power at their disposal, but a growing number of them are spending much of their time sitting in front of a Macintosh — and loving it. The Mac's ease of use, convenience, and large software library are among the things that have attracted them. In many cases, however, the drawing card is the Macintosh's great graphics capabilities, which allow scientists to convert data into graphics for visual analysis.

Recent Macintosh applications have given users the ability to compress as many as a million points of data in a single color graphic. Add animation to it, and you can then display many times more data in rapid sequence. A lot of modern researchers use these techniques in association with mathematical and statistical modeling in order to gain the broadest possible spectrum of viewpoints for understanding a research project.

It's not only high-level researchers who make use of visual data analysis. There are a number of commonly used programs that let Macintosh users investigate data from a visual standpoint — these range from home-investment applications that let you plot stock-market trends to the mathematics and statistics programs that are discussed in this article.

Figure A shows a simulated supernova blast wave created by scientists at Lawrence Livermore National Laboratory, using Image software from NCSA (the National Center for Supercomputing Applications). The NCSA created some of the first high-end visual-data-analysis applications for the Macintosh, and this project produced observation predictions to be tested with the Hubble space telescope.

NCSA Image, DataScope, and PalEdit are all public-domain software (free if you download it; $30 on-disk) that can transform large data sets into 8-bit-color graphics and that let users edit the palette for optimum effect. NCSA, University of Illinois Urbana/Champaign, 605 E. Springfield Ave., Champaign, IL 61820; (217) 244-0072.

Spyglass markets four software products that have their origins in NCSA's public-domain software: View ($395), Transform ($395), Dicer ($495), and Format ($195). Although they have the same file format as the NCSA applications, Spyglass has polished them and added new functions. Dicer, for example, lets you view cross-sections of a color matrix (see Figure B). Spyglass Transform and Spyglass View were released earlier this year (see review, October '90, page 72); Dicer and Format should be available by the time you read this. Spyglass, Inc., 701 Devonshire Drive, C-17, Champaign, IL 61820; (217) 355-1665.

Igor ($295) is a data-analysis tool for scientists and engineers (see review, August '90, page 48). Its analysis capabilities include a general mathematical-expression evaluator, a whole range of curve-processing operations, and a macro facility. Igor's data analysis is based on a data structure called a wave. Each wave consists of a one-dimensional array of numbers; you can create as many waves as you need.

One of Igor's uses is in curve fitting, in which researchers create a math function to model data derived from experiments — for instance, the widths of laser pulses (see Figure C). WaveMetrics, P.O. Box 2088, Lake Oswego, OR 97035; (503) 620-3001.

— Scott Beamer

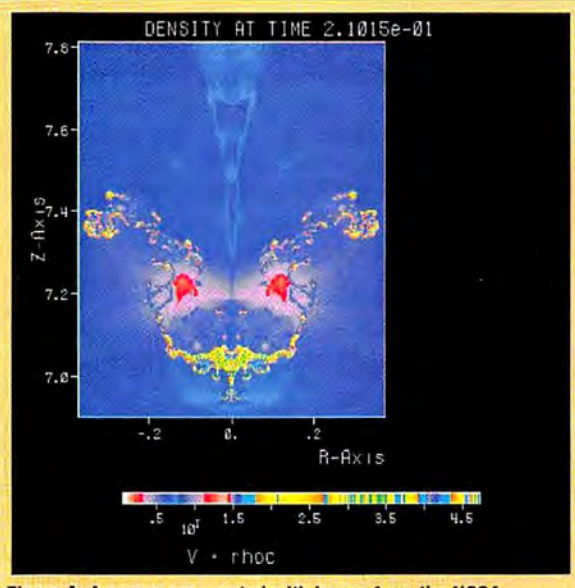


Figure A: A supernova created with Image from the NCSA. (Created by Richard Klein, Chris McKee, Phil Collela, Tom Kelleher, and Peter R. Keller, Lawrence Livermore National Laboratory.)

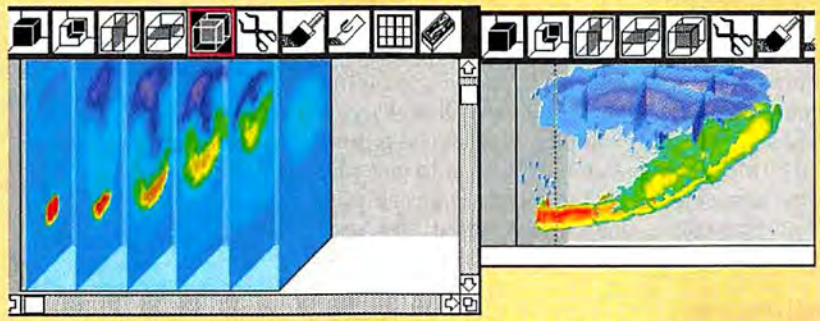


Figure B: Spyglass' Dicer was used to create cross sections of a 3-D matrix.

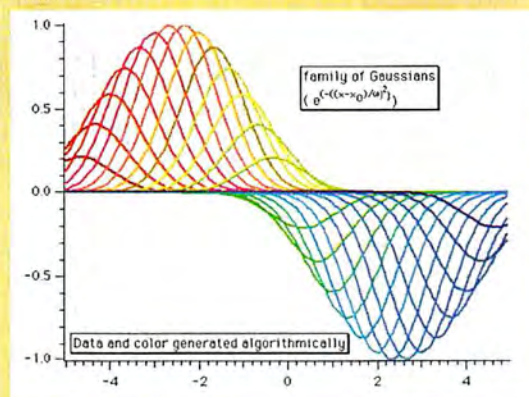


Figure C: This mathematical function was generated and plotted with WaveMetric's Igor. Plotting a mathematical function lets researchers model scientific processes.

variables and with the chart type you need. Generating the chart requires you to leave SPSS and then open CA-Cricket Graph and the newly generated Cricket data file.

SYSTAT 5.0. SYSTAT 5.0 is easier to use than and remedies many of the drawbacks of previous versions but at the cost of intensive memory requirements. Its interface is now much more Mac-like, and access to its abundant statistics and charting procedures is through two convenient tear-off, hierarchical menus. It has kept some of the slow and awkward data- and variable-handling features of its earlier versions, however.

The package has exploratory-data-analysis tools, such as scatterplot brushing and selecting (see Figure 3). You can use these tools to locate plot outliers in the Data Editor and to make subsets of a plot's data values for other analyses.

SYSTAT's 3-D spinning plots let you probe your data for interesting relationships that are not visible in fixed views. These tools aren't as extensive and flexible as those in JMP and Data Desk 3.0, but they're superior to anything that Minitab and SPSS offer.

SYSTAT has flexible and easy-to-use charting procedures, but its speed problems, memory limitations (in the 4-megabyte version), and awkward data handling can be annoying. Unlike SPSS and Minitab, SYSTAT can't hold new variables created by procedures in memory; instead, users must open new files in which to store them. Constructing a chart with a variable from the original data set and a newly computed variable requires you to cut and paste to combine the two data sets. To perform analyses by subgroups (by sex, for example), you have to presort the data set by the grouping variable, save it in a new file, and then open the new file for the subgrouping analysis. In SPSS or Minitab, a one- or two-word "by sex" subcommand performs the same analysis.

The Final Analysis

If you want sophisticated statistical analysis, note that each of these packages requires some study before you can fully make use of its features. Expect also to face some performance trade-offs when deciding which application to buy. If you get SYSTAT expecting the intuitive interface of the typical Mac application, you'll be disappointed. Yes, it has dialog boxes and tear-off menus, but selecting options in its jam-packed dialog boxes is not a trivial feat. On the other hand, if you choose SPSS and Minitab because you're familiar with their DOS or VAX counterparts, you may end up limiting the data exploration you can do. You'll also lose efficiency if you have to use other software for your graphics.

Whichever package you select, you'll be happy that you no longer need to rely on other platforms to answer the research questions you want to ask.

Statistics programs can't do everything, however. If you want to be able to manipulate algebraic equations on your Mac at a fairly sophisticated level, a program such as Prescience's Theorist or Wolfram Research's Mathematica may be what you need.

Two Modern Math Labs

Since the advent of personal computers, businesspeople have been able to ask what-if questions and find quick answers on computers. What if a loan were paid off a year sooner or a contractor's final costs were twice the projected amount? Plug the right equations into Lotus 1-2-3 or Excel, and out pop the answers. Scientists, however, have rarely had this luxury, because most spreadsheets are poor at understanding the equations of matrices, integrals and derivatives, vectors, and complex numbers that describe the physical world.

Lately, several math programs that deal with equations have come to the rescue. These packages are modern-day mathematics labs, letting users enter, manipulate, and visualize the behavior of almost any mathematical expression. Two of the most popular and powerful such

Time-Series Analysis

Until SPSS and Minitab were released, SYSTAT was the only general statistics package for the Mac to include time-series procedures, which many business and engineering companies use for such tasks as managing quality control and inventory or for tracking stock prices, interest rates, inflation, and housing starts. Time-series analyses are used to predict future quantities by looking at how the quantity has changed in the past. They can also be used to study what impact an intervention will have on an activity.

To illustrate the procedures that are involved in a time-series analysis, we used the three packages to perform a classic textbook time-series analysis: Forecasting future airline-passenger volume from a data set of the number of monthly international airline passengers over an 11-year period.

The data contains several trends that make this analysis difficult: The number of passengers is not constant over the course of a year, and certain seasons (late summer, for example) are peak travel times (see Figure 2). More-continuous trends—the inflation rate, for example—also need to be considered. A time-series analysis lets you develop a mathematical model of the data that takes these trends into account when predicting future travel patterns.

Specialized plots let analysts use data from the previous month and seasonal trends to uncover current influences on data values. By contrasting the plots, analysts can decide which data transformations they need to perform before they can create a usable model of future trends.

With SPSS you can specify these transformations on the command line. With SYSTAT, however, you must make separate choices from the Series menu. With Minitab you need to use three separate data-transformation commands. Finding the right model is an iterative process; we found it easier to change the settings in SYSTAT's dialog box or to change SPSS' few commands than to change Minitab's commands.

You can either print or save and chart the forecasted values along with the original series. SYSTAT saves data clumsily, but it produces the best charts. SPSS saves data easily but requires switching to CA-Cricket Graph for producing attractive graphics. Minitab is good at saving data, but it produces the least attractive charts.

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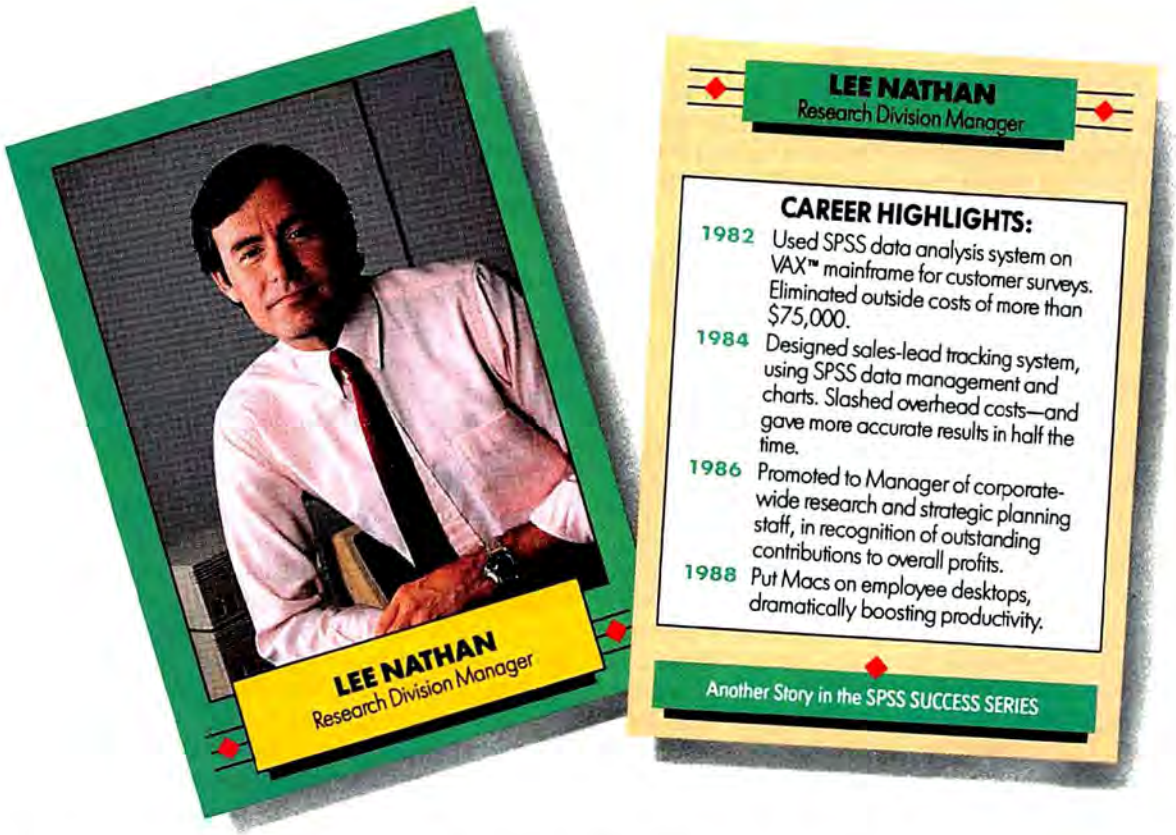

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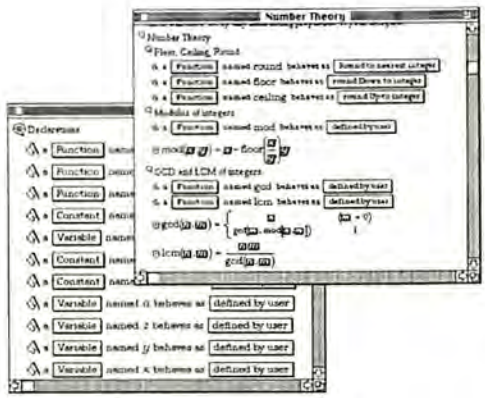


Figure 7: Theorist provides many library notebooks that contain preprogrammed common mathematical operations. Every new Theorist notebook contains default definitions that you can delete, modify, or add to.

Figure 8: In a typical Mathematica session, you type in formulas and view solutions. Mathematica does not convert answers to decimal form until you ask it to, and then it computes a full 200 decimal places (or more) for any quantity.

programs for the Mac are Mathematica (see "Enter Mathematica," November '88, page 199) and Theorist (see review, June '90, page 57).

Yin and Yang

Mathematica and Theorist evolved over disparate paths into programs with similar capabilities but very different user interfaces. Theorist is published by Prescience, which produces Expressionist (see review, July '90, page 80), an intuitive and much-acclaimed DA for mathematical typesetting. Expressionist knows all the rules about typefaces and sizes for producing pictures of equations, but it knows none of the rules for solving and manipulating them. After receiving countless requests, Prescience developed Theorist as a tool for solving, manipulating, graphing, and animating the equations Expressionist can typeset. Not surprisingly, moving equations between Expressionist and Theorist is a simple matter of standard cut and paste.

Theorist adheres strictly to the WYSIWYG doctrine, displaying equations in "standard" mathematical notation, complete with integral signs, superscripts, and proper punctuation (see Figure 7). (There is also a FORTRAN-like mode for those who'd rather work in a procedural language.) When the program performs calculations, changes take effect immediately, so you're never left wondering whether the current display needs to be updated. With Theorist, you can also manipulate equations by using point-and-drag techniques.

Mathematica takes a different approach to symbolic math. It has a command-line interface and block-character representation of equations that differs from the textbook manner of representing them.

The program requires that all input comprise linear rows of symbols, the same way equations are expressed in computer languages such as FORTRAN. Calculations are performed in batches by the command-processor kernel, the "core" of the program, which turns commands into output. The kernel defaults to returning its output in a hybrid linear-row format (see Figure 8). If you wish, you can save output equations in a file format readable by the popular TeX equation-formatting language, which is understood by a variety of Mac word processors.

Math Muscle

Interface aside, Mathematica and Theorist are built to perform many of the same tasks. Both programs can solve integral and differential equations, either numerically or exactly, if possible and if within their repertoires of known solutions. Both can factor polynomials and simplify complicated expressions. Both can solve systems of linear equations and perform matrix manipulations. Both can work with complex numbers and geometric and trigonometric functions. And both programs come with extensive libraries of special functions such as Bessel and gamma functions that you can extend indefinitely.

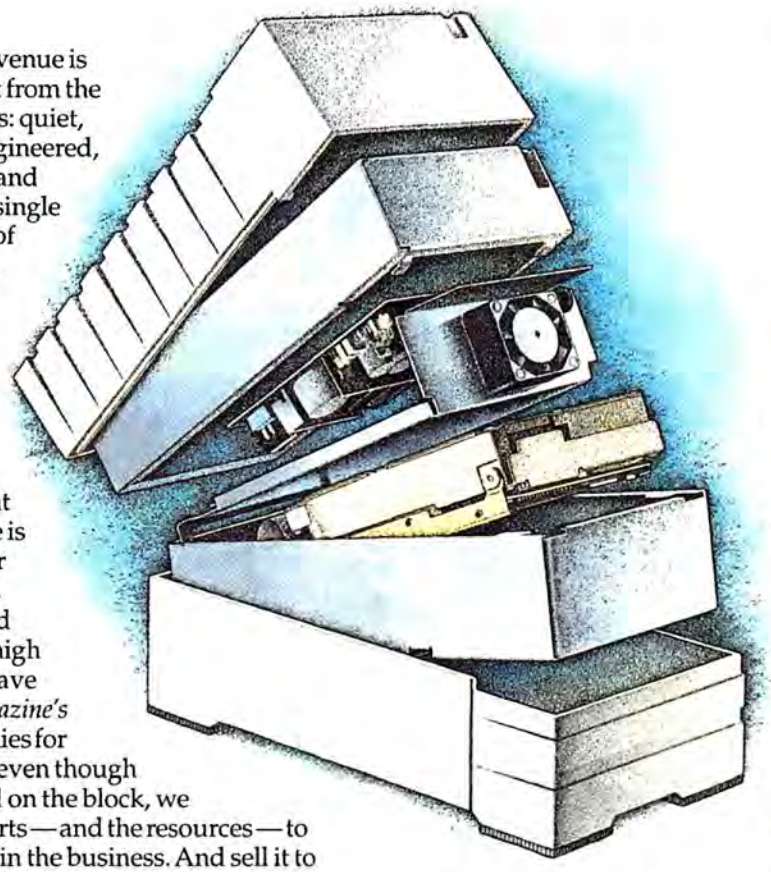
Mathematica performs all calculations exactly (or symbolically) unless you ask for numerical results, although you can instruct it to print any answer to a specific number of decimal places. There's no limit to how large or small numbers can be. Theorist maintains rational expressions in native form if desired, but it truncates individual numbers to 19 decimal places. Most users will notice no difference between the programs.

Both of them use the notebook metaphor. When first launched, each program opens up a text-editor-like screen, where you enter equations. As the session progresses, the programs retain information and you can edit, move, or save it as desired. Once you've collected a set of definitions, equations, and/or graphs that might be useful in the future, you can save the notebook as a starting point for later work (see Figure 7 for an example of Theorist's notebooks).

You can program both Theorist and Mathematica,

How The New Kid On The Block Made The Best Drive In The Business

The Protegé from MacAvenue is everything you'd expect from the best drive in the business: quiet, cool, quick, elegantly engineered, tough enough to travel, and priced to move. But the single most important feature of this handsome little box has more to do with its ancestry than with its aggressive price.



The Protegé hard drive features an out-standing pedigree. That's because the parent company of MacAvenue is CompuAdd, a computer industry leader in value, performance, service and support. CompuAdd's high quality and low prices have made it one of *INC. Magazine's* fastest-growing companies for three years running. So even though MacAvenue is a new kid on the block, we showed up with the smarts—and the resources—to build you the best drive in the business. And sell it to you for the best price on the market.

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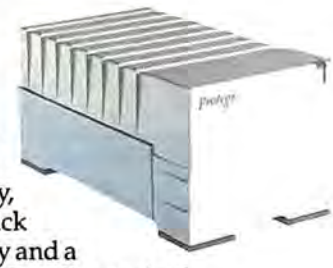
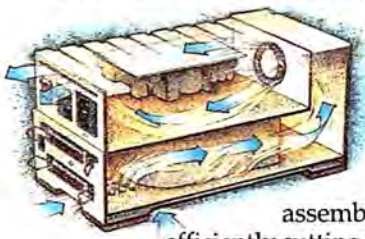


Here's how the Protegé will turn you on:



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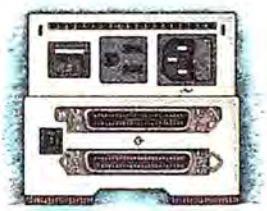

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although only Mathematica supports procedural programs, which are similar to having a macro language available. This means that Theorist and Mathematica can accept definitions such as $a = 5$ or rules such as "the function MYFUNCTION is defined to produce the reciprocal of the sine of its argument" and apply them when appropriate. Mathematica, however, lets you go beyond solving equations to automating the procedures used to solve them.

Graphic Math

When it comes to charting, Theorist and Mathematica can handle simple *x*-*y* plots, contour plots, parametric plots, and various kinds of 3-D plots. Both support full 32-bit color, with striking results. And both programs can animate sets of graphs — useful for visualizing the effects of modifying one parameter of an equation.

Theorist's graphs and animations are easier to create and modify than are Mathematica's. With Theorist, creating a graph requires selecting the appropriate equation and then selecting the desired graph type from a menu (see Figure 9). You change characteristics such as size, scale, perspective, and color by using menus, buttons, and a list of charting characteristics that accompanies each graph.

Mathematica generates each chart from a command

Math Alternatives

If you don't need all of Theorist's and Mathematica's power and functions but still want a program that has some math muscle, here are a couple of programs to consider.

Maple 4.2.1

Maple, a popular algebra program on IBM, Digital, and Honeywell mainframe computers, has now been adapted to run on the Mac. The Mac version ($395) is somewhat akin to Mathematica, containing a procedural programming language and a command processor. It has no facilities for accessing mainframe computing power or for generating 3-D graphs, however. Input and output are line-based, and complex equations look nothing like their typeset counterparts.

Maple has many of the same features that might attract users to choose Mathematica rather than Theorist. You can use Maple's procedural language to build customized root-finding algorithms or to implement solution algorithms for ordinary differential equations. The program even provides examples of optimizations, computed efficiently by the Simplex method, written in the Maple language. Maple programs are a little less cryptic than Mathematica's, and Maple has a higher symbolic level than does Mathematica — for example, it allows you to symbolically solve some differential equations.

Maple was developed as a tool for teaching computation and mathematics at the university level, and it performs this function very well. It's also a useful tool for any practicing engineer or scientist who doesn't need Mathematica's stellar graphical or networking capabilities. Brooks/Cole Publishing Co., 511 Forest Lodge Road, Pacific Grove, CA 93950; (408) 373-0728.

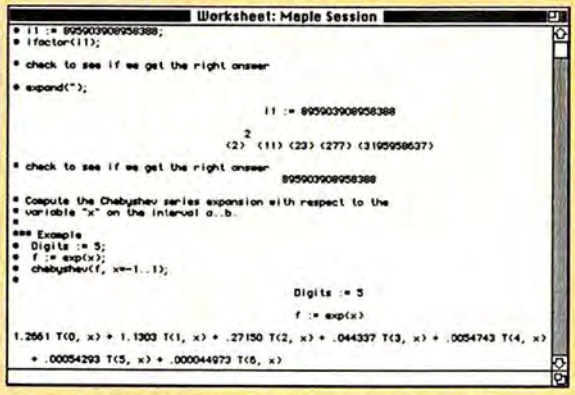


Figure D: A Maple session includes a mixture of commentary text and expressions to be evaluated. The session notebook keeps track of your work.

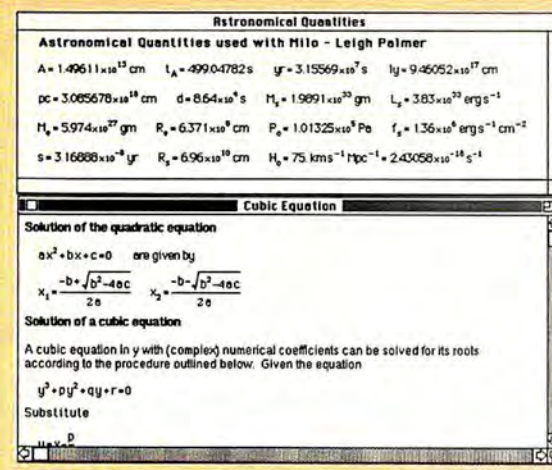


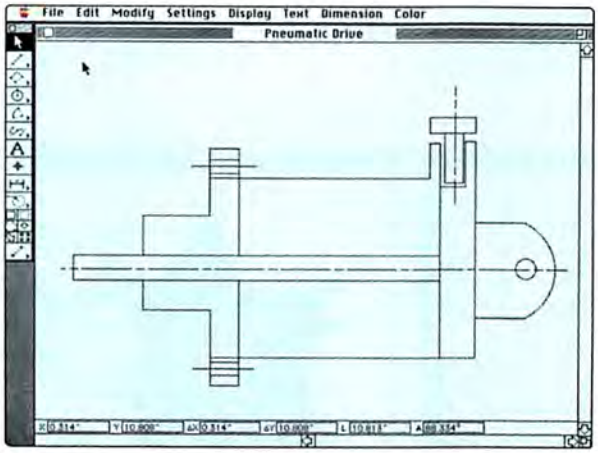
Figure E: Milo contains ready-to-use files with useful physical constants and procedures for performing common tasks such as finding square and cubic roots.

Milo 1.0

Paracomp's Milo ($249), a "math processor," bears some resemblance to Theorist (see review, July '90, page 80). It shares Theorist's qualities of being true to the Mac WYSIWYG interface, it's extensible through notebooks and rule sharing, and it doesn't have a procedural programming language. Milo performs symbolic mathematical manipulations competently, but it's less powerful than Theorist is.

Milo's user manual lacks some elements: It presents a thorough description of what each command is for and then neglects to show the command action for performing tasks such as solving sets of simultaneous equations. Milo supports the creation of *x*-*y* graphs, but you can't use it to create color or 3-D plots.

Milo is the least expensive product of the four reviewed here and is also the least hungry for raw hardware — a Mac Plus and a floppy-disk drive can run Milo comfortably — so it will appeal to many less demanding yet inquisitive mathematicians. High-school and college students who want to investigate the behavior of the vectors and integrals they study will find Milo up to the task. It could also be useful for budding geniuses taking their first algebra or geometry course in grade school. Its well-designed user interface, which lets you enter equations in many different ways, makes the job a little easier too. Paracomp, Inc., 123 Townsend St., Suite 310, San Francisco, CA 94107; (415) 543-3848.



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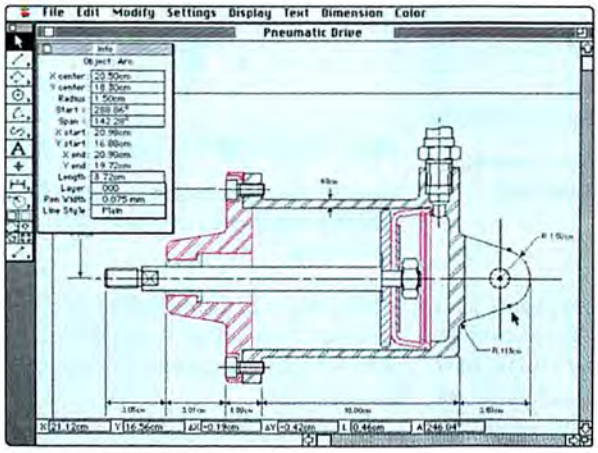

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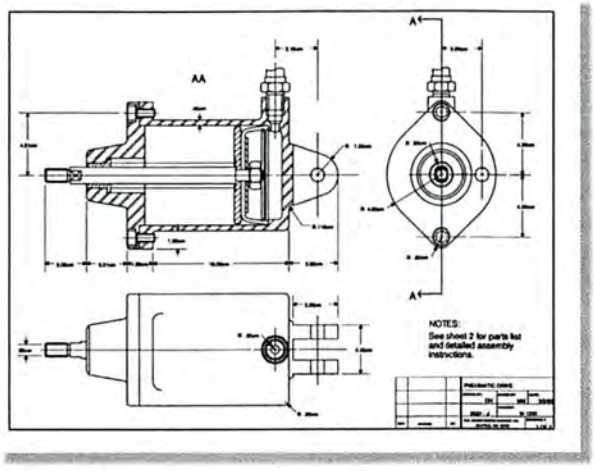

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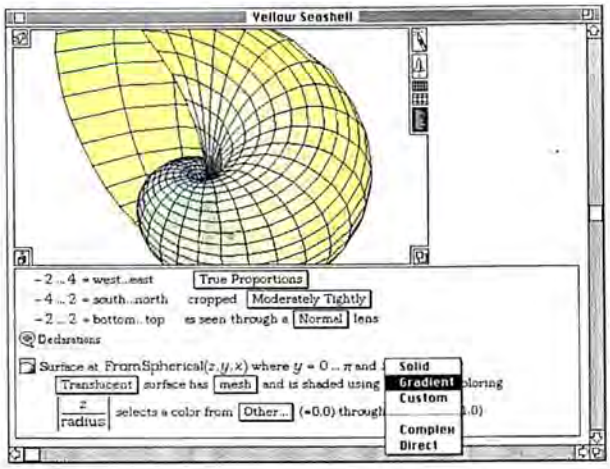

Figure 9: Theorist charts are always followed by a set of descriptive statements. By typing and clicking, you can change the color, shading, and orientation of a graph interactively.

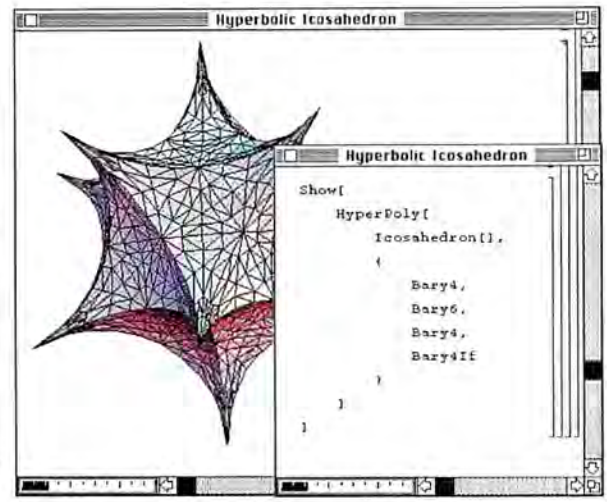

Figure 10: These few lines of Mathematica code produced this hyperbolic icosahedron (20-sided solid), once some functions had been defined.

batch, building up the chart from elementary pieces such as line segments and polygons. It then produces the chart in PostScript, which is interpreted into the QuickDraw picture you see on-screen (see Figure 10). Each time you change a parameter, you must modify the command (which often requires a trip to the user manual) and repeat the process.

Which Is for Me?

Although Mathematica and Theorist solve similar problems, differences in their user interfaces and networking capabilities, and even in their cost, will ultimately determine which program is best for a particular application. In a few cases, the decision will be clear-cut, because one package has a required feature and the other doesn't. In other cases, the question of which program's interface feels more comfortable to a particular user will carry more weight.

Both Mathematica and Theorist are well-designed and well-implemented programs. Their documentation is complete and thorough, and technical support by phone (and by fax and an electronic bulletin board, in the case of Mathematica) should quickly remedy any serious problems. If cost is an important consideration, note that Theorist, at $379.95, is less expensive than Mathematica, which costs $495 ($795 for the Mac II version).

As with any open-ended, memory-intensive program on the Mac, both Theorist and Mathematica have the habit of running out of memory when generating especially complex graphs or solving particularly involved equations (although Theorist is leaner and can run simple 3-D animations with 1 megabyte of RAM). Operating without MultiFinder and with as much RAM as possible, as well as cutting back on the number of INITs in your System Folder, helps. (System 7.0's virtual-memory capabilities will also alleviate this problem — if you have hardware that supports it). Both programs usually exit gracefully from such memory shortages and tell you what has happened.

So how to choose? Here are a few features you may want to look at when deciding:

Interface. Theorist is a Mac application in the true sense. The menus, icon bars, graph buttons, and input system — in short, all aspects of the program — were designed to be easy to understand and use (see Figure 10). The dialog boxes that pop up periodically to ask for help in defining unknowns are exceptionally clear. The format of notebooks makes it easy to collect a set of definitions you use often and keep it handy. And the immediate feedback Theorist provides after every manipulation adds confidence that you're on the right track.

On the other hand, Mathematica is a tool that will please high-end programmers. It is sufficiently un-Mac-like to make even the most devout UNIX users happy and contains a book full of commands to master. It makes good use of the Mac's charting abilities and even adds nice Mac-style touches to the notebook editor, so you can cut, paste, and otherwise manipulate previous work easily. Its programming language is a fun tool for the curious to explore — you can use it to perform arcane tasks such as list processing and generation.

Network compatibility. Mathematica is supported not only on the Mac but also on other personal computers and on many UNIX workstations and supercomputers. All implementations of the Mathematica kernel are compatible as long as they have the same version number.

Mathematica for the Mac has a networking window and protocols, so you can make connections to other Mathematica kernels. Usually you can manipulate equations efficiently without networking, but for especially

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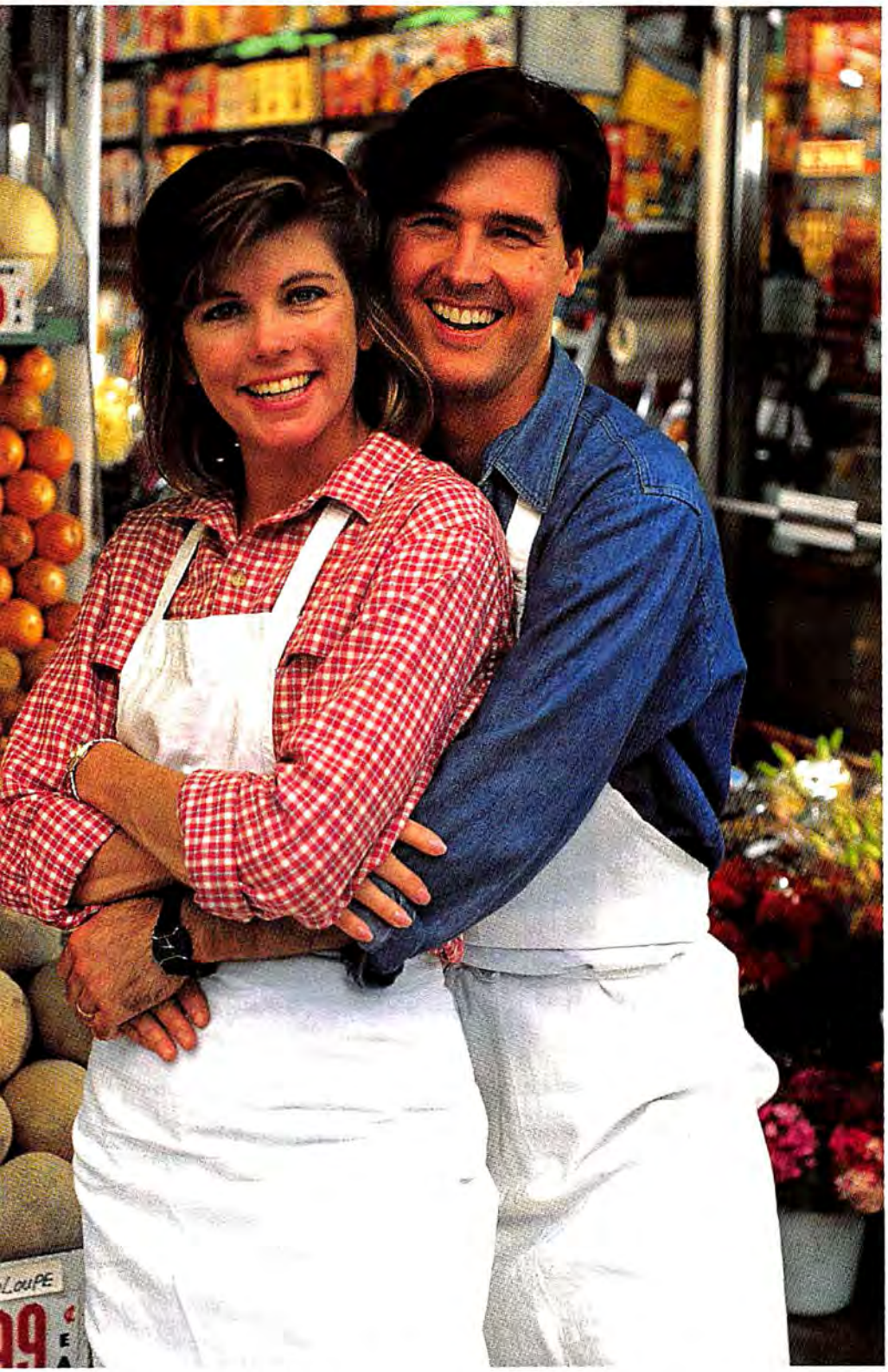

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large calculations, the ability to use the friendly Mac interface and the raw number-crunching power of a remote computer is crucial. Theorist works only on the Mac and includes no networking capability (other than simple AppleTalk-supported file sharing).

Even if you're a lone Mac user and don't require the computational assistance of a workstation or supercomputer, you may find the ability to export Mathematica charts in native PostScript helpful. Both Mathematica and Theorist can save graphs as PICT2 items.

Procedural programming. For most applications, complex programming is not required. For some sophisticated tasks, however — such as finding roots or solving simultaneous equations — complicated functions involving decision loops or iteration are necessary. If you need these functions, Mathematica is your only choice.

The Best Fit

High-school and college math students, as well as professionals who need to automate equation manipulation, will be happiest with Theorist's capabilities. Formula-typing errors are easy to see, and you can instantly prepare complex graphs from equations. Graph default settings are well chosen and easy to change. Theorist doesn't require users to have any prior knowledge of computer programming, and it makes fewer demands on system memory and disk space than does Mathematica.

Many commercial scientists and engineers who need quick solutions to integrals or fast plots of a theory will also be pleased with Theorist's capabilities. Users who need to develop functions with procedural programming or who are networked into workstations or supercomputers running Mathematica — and who don't mind taking the time to learn its sometimes contorted procedural language — will appreciate Mathematica's additional capabilities. Often, these are users with Macs that have more than 5 megabytes of memory and plenty of disk space for intensive Mathematica sessions.

A growing number of serious number-crunching programs are filtering into the Macintosh world from other platforms; still more are being created especially for the Mac and Mac-only users. With tools such as these, the Mac can be a serious high-end tool for study, research, and analysis.

Linda Custer, a research biochemical engineer at W.R. Grace & Co. in Columbia, Maryland, reviews science, engineering, and mathematical software. Minna Levine is a statistics and market-research consultant based in Belmont, Massachusetts. She writes about business applications for DOS machines and the Mac.

The Bottom Line

Minitab 6.2, SPSS for the Macintosh 4.0, and SYSTAT 5.0

These high-end statistics packages allow you to perform sophisticated procedures such as time-series analyses. Deciding which statistics package to buy boils down to knowing which procedures you *must* have and how much money you can afford to spend.

If you need lots of procedures and can afford all its modules, **SPSS** ($795; additional modules, $395 each) is the top choice. If you need procedures, such as multivariate or ARIMA procedures, that are more sophisticated than those available in a lower-priced statistics package but you have limited funds and limited hardware, **Minitab** ($695) is best. If you need lots of procedures and high-quality charts, go for **SYSTAT** ($795; additional modules, $110).

Remember, however, that with SPSS or Minitab, you not only need an additional charting package but you also miss out on the fun of using the Mac's interactive graphical interface to explore your data.

Left to right: Minitab 6.2, SYSTAT 5.0, and SPSS for the Macintosh 4.0 are high-end statistics packages that let you perform many sophisticated statistical operations.

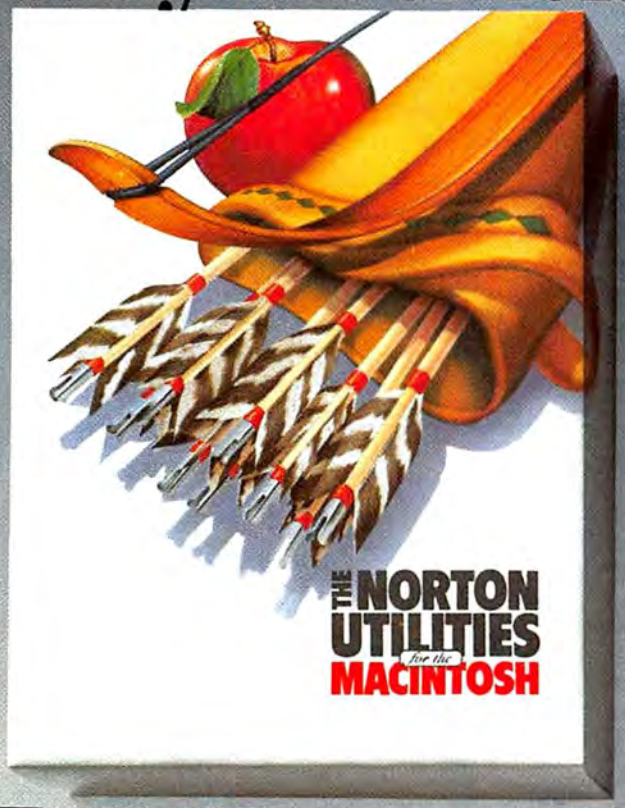
Mathematica from Wolfram Research (left) and Theorist from Prescience (right) are symbolic-algebra programs. Mathematica has a procedural language that lets you automate procedures; Theorist offers powerful equation manipulation with a friendly Mac interface.

Mathematica and Theorist

Mathematica and Theorist are powerful equation solvers. **Theorist** from Prescience ($379.95) has an easy-to-use Mac interface and can prepare even complex graphs from equations instantly. It does not require any prior knowledge of computer programming, and it makes fewer demands on system memory and disk space than does Mathematica. Complex procedural programming is not possible.

Wolfram Research's **Mathematica** ($495; Mac II version, $795) is more suitable for users who need to develop functions by using procedural programming or who are networked into mainframes running Mathematica on other platforms. Mathematica is memory-intensive and requires you to learn its difficult syntax.

Any resemblance to other Macintosh utilities is pure coincidence.



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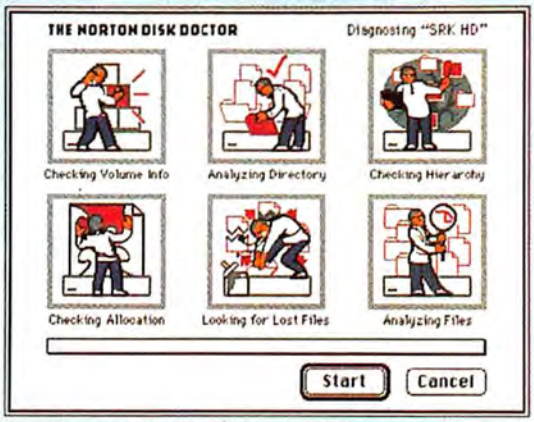

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Table 1: Features of Minitab, SPSS, and SYSTAT

	Minitab 6.2 ‡‡‡	SPSS for the Macintosh 4.0 ‡‡‡‡	SYSTAT 5.0 for the Macintosh ‡‡‡‡
List price	$695	$795; Advanced Statistics, Trends, Tables, and Categories modules, $395 each	$795; Design, Logit, Probit, and Testat modules, $110 each
Comments	Fast. Handles data efficiently. No add-on modules. Command interface. Documentation and on-line help limited. No color graphics.	Modules provide most functions needed. Editable text. Good documentation. Limited native graphic functions. Command interface.	Mac-like interface. Plenty of procedures. Good graphics. 3-D charts, color graphics. Memory-intensive. Four-megabyte version can be slow.
Procedures			
Flexible tables, banners, stubs	no	Tables module	no
Reliability analysis	no	yes	Testat module
Log-linear models	no	Advanced Statistics module	yes
Repeated-measures ANOVA	no	yes	yes
ANOVA post hocs and comparisons	no	yes	yes
MANOVAs	no	Advanced Statistics module	yes
Cluster analysis	no	yes	yes
Principal components	yes	yes	yes
Factor analysis	no	yes	yes
Multidimensional scaling	no	yes	yes
Discriminant analysis	limited	Advanced Statistics module	yes
Correspondence analysis	no	Categories module	no
Conjoint analysis	no	Categories module	no
Survival analysis	no	Advanced Statistics module	no
ARIMA models	yes	Trends module	yes
Fourier analysis	no	Trends module	yes
Nonlinear estimation	no	Advanced Statistics module	yes
Logistic regression	no	Advanced Statistics module	Logit module
	Minitab, Inc. 3081 Enterprise Drive State College, PA 16801 (800) 448-3555	SPSS, Inc. 444 N. Michigan Ave. Chicago, IL 60611 (312) 329-3300	SYSTAT, Inc. 1800 Sherman Ave. Evanston, IL 60201 (708) 864-5670

Table 2: Features of Mathematica and Theorist

	Wolfram Research Mathematica 1.2	Prescience Theorist 1.01
List price	$495 (Mac SE/Plus), $795 (Mac II/SE/30)	$379.95
Program size	650K	510K
Library size (includes all notebooks)	1,418K	254K
Memory required	2,500K	600K
Precision	infinite	19 digits
Macro language	yes	no
Input equations	linear text	WYSIWYG
Output equations	hybrid	WYSIWYG
Matrices	list of list	WYSIWYG
Network to mainframe	yes	no
Math	command	interactive
Graphs	command	interactive
Automatic simultaneous-equation solving	yes	no
	Wolfram Research, Inc. P.O. Box 6059 Champaign, IL 61826 (217) 398-0700	Prescience Corp. 814 Castro St. San Francisco, CA 94114 (415) 282-5864

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By Aileen Abernathy and Salvatore Parascandolo

CLIP ARTISTRY

There's more to clip art than meets the eye. Here's how to choose, edit, and use it — plus a look at some of the top packages.

Everything from a simple letter to a company's quarterly statement can be improved with the right graphic. Since most of us have only minimal artistic talent, there's a booming market in precreated graphics, called *clip art*. This "canned" artwork has several advantages: It's always ready for use; it never wears out, no matter how often you use it; it can be edited and arranged in countless combinations; and it can be cataloged in any way that suits you.

At least 60 companies — ranging from the traditional clip-art giants (Dynamic Graphics, Metro ImageBase) to mom-and-pop shops (Artbeats, 3G Graphics) — produce electronic artwork for the Mac. Size doesn't equate with quality, however; some of the best efforts come from the smallest clip-art companies, who lovingly craft each image rather than mass-produce artwork by scanning in and cleaning up images from a paper-based library.

With so much to choose from, how do you find the artwork that meets your needs? First, consider the use — are you creating newsletters, advertisements, slide presentations, or party invitations? The output format can greatly affect your choice of file type and drawing style. What subject categories do you need? Clip-art themes

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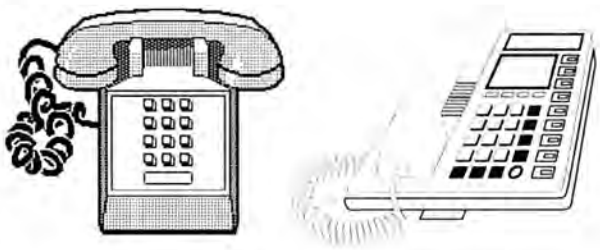
File Edit
Handshake

range from popular (business, sports, holidays) to specialized (medical, military, maps). What hardware and software will you be using to import, edit, and print the images? Do you need color artwork? Don't invest in color EPS images if your only printer is an ImageWriter. On the other hand, if you plan to edit your artwork in Illustrator, a library of MacPaint images will be of little value. Do you prefer images with coarse or fine resolution? MacPaint images have a resolution of 72 dpi (dots per inch), providing grainy images that are prone to the jaggies; a TIFF package might offer smoother images with 300-dpi resolutions. Do you need a steady stream of new images? Several companies, such as Dynamic Graphics and Multi-Ad Services, offer subscription services.

To get you started, here's some sage advice on clip artistry, including information on file formats and the storing and editing of images. Although we don't have space to list every clip-art company and its offerings, we've reviewed a few of our favorites and compiled a list of 20 vendors that produce a broad range of artwork so that you can compare prices, formats, and subject matter. (Some packages in the table have been reviewed previously; see "Clip-Art Collections," August '89, page 173, and "Classy Clip Art," October '89, page 229.) In future issues, we'll review packages that cover single topics (such as maps or airplanes), shareware offerings, and the growing number of collections available on CD-ROM.

File Formats

Macintosh clip art is available in every file format — MacPaint, PICT, TIFF, and EPS — and encompasses the two major types of electronic graphics (see Figure 1). *Bit-mapped* images are stored as layouts of individual pixels, or bits, whereas *object-oriented* clip art is composed of a series of drawing instructions. Bit maps are the default graphic type for anything that's scanned, painted, or captured from the screen. Many artists prefer the versatility of bit-mapped artwork for images with a hand-drawn or -painted look (see Figure 2). For example, you can create stippling and cross-hatching effects (such as electronic "woodcuts") much more easily with bit-mapped images than with object-oriented art. Bit-mapped images do have two major drawbacks: They are prone to the jaggies if they are reduced, enlarged, or rotated, and their resolution can't be altered to take advantage of a printer's output capabilities.



Object-oriented images overcome these limitations. Because they are stored as mathematically described objects and paths, object-oriented graphics can be resized

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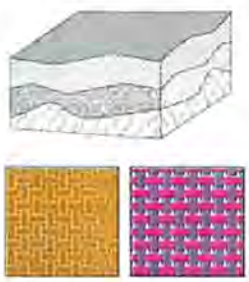
Adobe Collector's Edition: Patterns and Textures

★★★★★

If you're an Illustrator user and haven't yet gotten your fill of clip art, then the Adobe Collector's Edition: Patterns and Textures is the package for you. This superb collection of patterned fills has something for everyone, whether the job is advertising, architecture, interior design, mapping, or textile design. The 400 or so PostScript patterns include dot and line screens (simple and graduated); basic and nature-based textures; geometric, primitive, and ornamental patterns; and the standard patterns used in architecture, mapmaking, weather reporting, and geology. Each fill has repeating elements, or tiles, that you can apply to any shape to produce a seamless patterned area (see example below). Some patterns are transparent, so you can use them to simulate shadows or window screening.



As with Adobe's first Collector's Edition (Symbols, Borders & Letterforms), the artwork is pretty plain as is. But's that's OK, because Adobe *expects* you to jazz it up. All the patterns are black-and-white, but the identical elements of each pattern are subgrouped so that you can easily add shading or color (see example at left). The patterns are not saved as EPS files, so you can't directly import them into a page-layout program. Instead, you must create an Illustrator document, use one or more patterns, and then save the final image as EPS.

This $225 collection is physically huge, requiring nine disks, and Adobe recommends 2 megabytes of RAM. The user manual is a treasure trove of information. In addition to a pictorial catalog of the supplied patterns, a full-color section shows the various effects you can achieve by editing and coloring the tiles. There's also a guide to meshing the patterns with your artwork, some basics on selecting and moving objects, printing tips, and even procedures for making your own patterns. If you use Illustrator and want to extend both your business and artistic potential, this package is a must.

Artbeats

★★★★½

A well-chosen background on a book cover or magazine article can convey important information about mood and content as well as add aesthetic appeal. That's the concept behind Artbeats, a relatively new company started by illustrator Phil Bates. In just over a year, Artbeats has produced five packages of sophisticated, high-tech PostScript backgrounds. Natural Images 1 and 2 feature scenes from nature, such as marble, mountaintops, grass, water drops, clouds, and sand dunes. Potpourri and Dimensions 1 and 2 contain abstract and geometric patterns. Each package contains 20 full-page backgrounds — actually ten images in

Avid
FAST RELIEF FOR PAIN

Figure 1: Clip art comes in a wide variety of drawing styles and file formats. Notice the roughness of the bit-mapped MacPaint image (far left) compared with the other four images, which are all EPS graphics. Left to right: WetPaint: Classic Clip Art (Dubl-Click), ArtClips: Second Edition (Tactic), Works of Art: Laser Art (Spinnaker), ClickArt: EPS Business Art (T/Maker), and Images with Impact: Business (3G Graphics).

and rotated with no loss of quality. They are ideal for technical illustrations and other highly detailed work. In addition, object-oriented images are resolution-independent, meaning they can be output at the printer's best resolution. (For more information on graphics formats, file types, compatible applications, and format conversions, see "*MacUser* Guide to Graphics Formats," September '90, page 266.)

The first Mac clip art was in MacPaint format, which holds black-and-white bit maps with a resolution of 72 dpi. MacPaint is still the format of choice for many people, because the files are small, simple, and easy to import into nearly every application, from page-layout programs to word processors. Some clip-art companies, such as Metro ImageBase, produce images in TIFF format, which stores bit maps with higher resolutions (usually 150 to 300 dpi) and a variety of grays and colors. Image Club Graphics and a few other companies offer clip-art packages in PICT or PICT2 format, which can hold both object-oriented and bit-mapped art in a range of colors and resolutions. PICT and PICT2 are also the formats in which the Clipboard and the Scrapbook transfer their contents among applications.

Today, most new clip-art packages are in EPS (Encapsulated PostScript) format. The growing popularity of this object-oriented format stems from its clean, sophisticated images and crisp handling of fine details, text, and graduated fills. EPS images can be monochrome, grayscale, or color, and they print at the highest resolution available (see Figure 3). Instead of showing the actual PostScript image on-screen, EPS files display a quick-rendering preview image (in PICT format) that's a bit-mapped approximation of the printed image.

The editability of EPS clip art depends on how the file was saved. Most clip-art companies market EPS images saved as Illustrator files, which can be opened for full

both high- and low-contrast versions for versatility — and prices range from $79.95 to $129.95. Potential uses include book and report covers, stationery, advertisements, packaging, party invitations, and checks (see "Avid" box).

All images are created in FreeHand and take advantage of that program's facility with PostScript blends. Some images are transparent, so you can place them over text or other backgrounds. For instance, place the word *Party* behind the Confetti background (Potpourri collection), and you have an instant invitation. Because you can crop and size the backgrounds as you can any other graphic, you can even turn them into shaped fills and borders.

The disks include both the original FreeHand files (for editing purposes) and EPS files ready to drop into your favorite page-layout program. The images look great just as they are, but if you want to edit them, you need some familiarity with FreeHand and its handling of colors and fills. Then you can open a background such as Droplets (above) and apply sweeping changes, from altering the background color or shadows to changing the direction and intensity of the graduated fills. The manuals provide helpful design ideas plus tips on editing the original artwork. (At press time, Artbeats was about to release a CD-ROM disc containing all five packages plus Illustrator 88 versions of the files and several business-card templates.)

These are large and complex backgrounds — one file can be several hundred kilobytes — which means they demand RAM and take a while to print. To speed up printing, the EPS images in all packages purchased after May 16 include new PostScript code that prints graduated fills up to 80 percent faster. Still, be forewarned that the average printing time is two minutes. With Artbeats' images, however, the result is worth the wait.

Clipables

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C.A.R.'s Clipables ($149.95) is an enormous collection of EPS artwork, comprising some 600 images scattered across 17 disks — a whopping 10 megabytes of data in all. Overall, this is a comprehensive, economical package with nicely drawn images. C.A.R. also plans to offer periodic supplements of 120 to 200 images, and a CD-ROM disc with more than 2,000 images will appear in early 1991.

As you might expect from a general-purpose library that tries to cover everything, Clipables is a broad but shallow package. Topics include animals, business, dingbats, mortises, people, holidays, humor, maps, sports, and transportation. The collection lacks computers,

Figure 2: If you want clip art with a hand-drawn look, check out MacPaint or TIFF packages. EPS images may be crisper, but they can't easily reproduce sketchpad effects such as cross-hatching and stippling. This 300-dpi TIFF image comes from Metro ImageBase's ReportMaker collection.

editing by both FreeHand and Illustrator or dropped directly into a page-layout application. Non-Illustrator EPS files cannot be edited; they can only be placed into page layouts and cropped or resized. Artbeats, for example, creates its EPS backgrounds in FreeHand, and its packages contain two versions of each image: a noneditable EPS file and the original FreeHand file, in case you want to customize the artwork (which you then have to resave as EPS before using it in a page-layout program).

Finally, there's 3-D clip art, which inhabits a world all its own (see Figure 4). Both Enabling Technologies and Paracomp offer 3-D clip art, which is saved in the native format of the creating 3-D application (Pro3D or Swivel 3D, respectively). Using an editing program that comes with each collection, you can open the files and position, illuminate, color, spin, scale, and/or combine the images. When the 3-D scene looks right, you can export it to other applications in EPS, PICT, or MacPaint format.

Format Follows Function

Although you can use the same clip art for a variety of purposes, you should choose a file format based on your primary output medium, because the type of output can significantly affect image quality. Here are some pointers to help you choose your graphics for the job at hand.

PostScript printer. PostScript printers intended for personal and business use have resolutions of between 300 and 600 dpi. You can also obtain PostScript output from many QuickDraw printers by using PostScript-interpretation software such as CAI's Freedom of Press. In either case, EPS is the file format of choice, because it takes full advantage of the printer's PostScript capabilities. Object-oriented PICT images also print at the printer's best resolution. MacPaint, PICT, and TIFF bit maps are other options, although they don't look as sharp or smooth.

Non-PostScript printer. Printers such as the LaserWriter IISC and HP DeskWriter can't interpret the PostScript language, so they print only the bit-mapped preview portion of EPS images. These printers handle MacPaint, monochrome-TIFF, and PICT images quite well, however.

If you must print an EPS image on a non-PostScript device, the trick is to produce the best-looking preview image possible. To do this, open the EPS file in FreeHand or Illustrator, select the entire image, and scale it up 400 percent. This forces the preview image to be large and detailed. Resave the EPS file, import it into your layout, and reduce the image to one-fourth of its size. The result is an effective increase in resolution to about 300 dpi.

High-resolution imagesetter. Imagesetters have resolutions of 1,200 dpi or more and are perfect for printing

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tools, and plant life, and you may sometimes wonder how C.A.R. made its choices. For example, Famous People is an odd assortment of five images: Einstein, George Washington, Santa Claus, Uncle Sam, and Nofretete [sic]. The maps include only four of the seven continents, and the European map inexplicably includes only *Western* Europe. You may wish C.A.R. had included more basic images and bagged a few extraneous ones, such as the Dolphin Nymph and duplicated images of traffic stoplights and ladybugs. On the positive side, the well-rounded sports section includes activities such as billiards, bowling, and fencing.

Image quality is quite good; drawing styles include line art, cartoons, silhouettes, and shaded renderings. Excellent drawings abound in the sections on chemistry, finance, and holidays, among others. A few images do have an amateurish quality (dingbats come to mind), and there are occasional flubs: a bald eagle in molt, a tacky turkey, and a gruesome Einstein. The businesspeople have no facial features, which is disconcerting.

If you want to edit an image, you'll find that Clipables isn't as carefully conceived as are some other collections. Image grouping is particularly erratic. Some montages are subgrouped for easy separation and coloring, whereas elements of other images (pie-chart slices, countries on maps) are difficult to manipulate. For example, most of the people are Caucasian, but if image elements aren't grouped, changing skin coloring can be a challenge. In addition, the artwork suffers from occasional sloppiness. Some images are only partially opaque — one businessman's face is opaque but parts of his hand and shirt are transparent. The state maps' shadows vary in size from negligible to bizarrely large.

The manual is basic, but it includes pictures of all the images. There's no index, which would have been invaluable in locating images in such a vast collection. Although Clipables may not meet your every need, few other collections offer so much, in both quantity and quality, for so little. We think it's worth the investment.

MacGallery

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Dream Maker Software, which markets the Cliptures series of EPS artwork, also offers a modest MacPaint package called MacGallery ($49.95). This whimsical collection is definitely *not* business-oriented; instead, it's ideal for children's publications, newsletters, fliers, invitations, and announcements. The more than 400 images are all original illustrations and include holidays, food, sports, borders, phrases, mortises, animals, plants, and babies.

As always, there are images that fall outside the

clip art with smooth gradients, sharp lines, and high-resolution bit maps. All the comments for PostScript laser printers apply here; in addition, the resolution of bit-mapped images should be 300 dpi for monochrome graphics and at least 150 dpi for gray-scale and color artwork.

Color separation. EPS and TIFF are your best bets, depending on the type of graphic. If you have a PICT2 bit-mapped image, use a color painting or image-editing program to convert it to TIFF format.

Screen presentation. If you need clip art for projected presentations, self-running demos, or hypermedia, then high-resolution images will only slow things down and eat up disk space. A monitor is a low-resolution device, so a 72-dpi MacPaint image looks just fine. PICT and TIFF images (both monochrome and color) are also acceptable. If you have a favorite EPS image you really must show, use FreeHand or Illustrator to open (not place) the file and size it. Display the artwork with all its assigned colors and line weights, and then take a "snapshot" of the image with a screen-capture utility such as Capture, QuickShot, or SnapJot. You now have a compact, low-resolution PICT2 bit map that you can paste or place into your presentation.

Slides. A film recorder can turn your presentation into sharp-looking 35mm slides. As with printers, film recorders can be divided into PostScript and non-PostScript units, so many of the same comments apply. PostScript-driven film recorders output EPS images beautifully, and the other clip-art formats perform almost as well. Non-PostScript film recorders work best with MacPaint and PICT images; they can print only the bit-mapped preview portion of EPS images. If you need to include an EPS image, the scaling technique described for non-PostScript printers can help you obtain good-quality output.

Figure 3: The EPS format produces crisp, sophisticated graphics with fine details and subtle color blends, and they always print at high resolution. Totem Graphics produces some of the classiest color EPS artwork; Volume 4 contains this Pumpkinseed fish.

Artful Management

Once you've purchased a few clip-art packages, you quickly learn that finding an image can be a time-consuming chore if you haven't organized your collection. Some clip-art suppliers have thoughtfully included utilities for browsing through and accessing their collections. For example, both Dubl-Click and T/Maker provide DAs that let you open, scale, edit, and copy MacPaint images. Dubl-Click's ArtRoundup also has a

standard categories. In MacGallery's case, it's teddy bears, dinosaurs, and cartoon arms and legs (56 of them!) for "enhancing" other images. The Christmas images include figures from the *Nutcracker Suite*. You also get four pieces of presized stationery: a greeting card, a three-fold mailer, a business card, and a certificate.

MacGallery has a nice manual that's loaded with advice on working with MacPaint images, including tips for overlaying images, showing motion, duplicating and inverting images, creating shadows, and working with borders. Although MacGallery is not as extensive as some other packages, it's a nice starter collection of MacPaint clip art, especially if you work with children.

WetPaint

$$$$$

If you need massive quantities of well-drawn MacPaint graphics, take a look at Dubl-Click's ten-volume WetPaint series ($79.95 per volume). The best-seller is Classic Clip Art, an enormous collection that's sure to have something for everyone, with art styles ranging from line drawings to digitized images. Contentwise, For Publishing is a bit more hit-and-miss, but Animal Kingdom has a good selection of wildlife plus hunting and camping images. Special Occasions covers all the holidays and includes a nice selection of religious artwork. The images have an "antique" look, an illustration style that's continued in the Printer's Helper, Industrial Revolution, and Old Earth Almanac packages. Dubl-Click does an excellent job of creating images reminiscent of the woodcuts and other old-fashioned artwork that adorns old books, dictionaries, and encyclopedias. There's a unique package called MacTut ($49.95), a collection of ancient Egyptian artwork that includes a dozen ProGlyph hieroglyphic fonts. (The MacTut manual provides instructions on creating cartouches, or Egyptian logos, and writing messages in ancient Egyptian.)

The company returns to the modern world with its two most recent collections. Island Life covers the tropical world, focusing on Australia and Hawaii. All the People shows all kinds of folks in all types of situations: children, famous people, office situations, occupations, ethnic and international backgrounds, family and sports images, and even people in medieval garb. Many images are drawn in a cartoon style, and some illustrations are modular — for example, you can assemble your own "instant employee" from provided body parts. Unfortunately, the cartoon people all have the same facial expression, which gets pretty stale.

As a nifty bonus, every WetPaint collection comes with two DAs. ArtRoundup lets you open, scale, edit, and copy images among programs without using a paint application or a scrapbook. It also has

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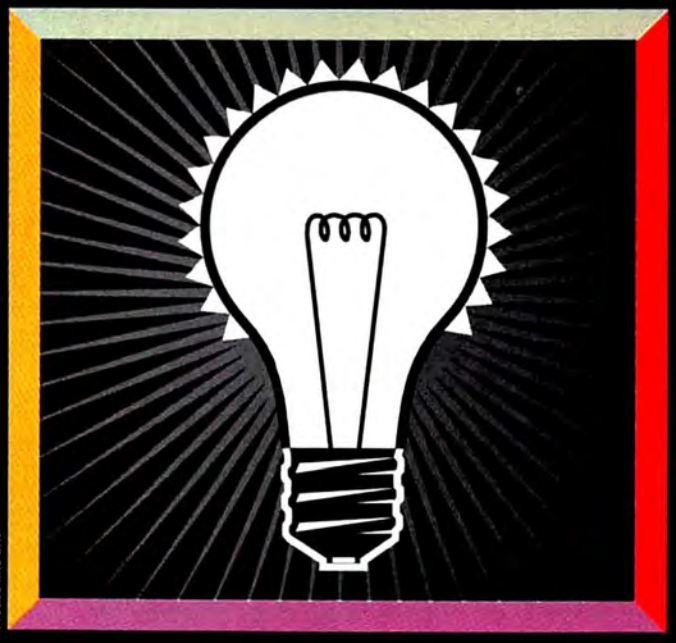

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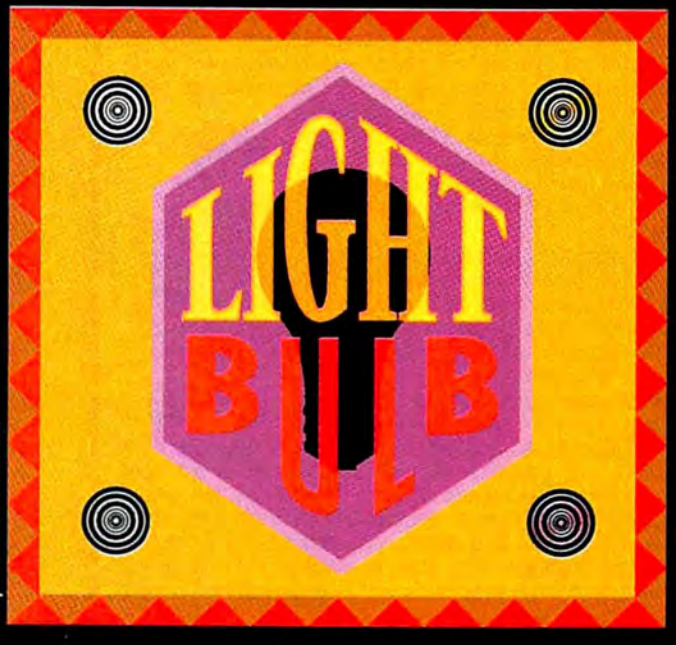

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It could be enlightening.

ADOBE

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Figure 4: Three-dimensional clip art has high visual impact. You manipulate and combine 3-D objects by using bundled programs and then export them to other applications in the common Mac file formats. This image is from Paracomp's new SwivelArt collection.

Slideshow feature that lets you browse through many files at once without having to open and close each one.

If your clip-art packages don't come with such goodies, don't fret. There are other ways, both basic and specialized, to organize your art. For images stored on a hard disk, the simplest scheme is to sort them into appropriately named folders. You can view each folder's contents by name, date modified, type (creator), size, and icon color. A file-finding utility can locate the occasional lost needle. (A few companies, such as Metro ImageBase, use cryptic codes as filenames, which means you have to rename the files if you want descriptive titles.)

For browsing through a clip-art collection, albeit slowly, you can use applications you already own. Page-layout, presentation, and drawing programs can import or directly open a variety of formats. Several applications, including Digital Darkroom, ImageStudio, and Studio/8, show a preview image in the Open dialog box. You can use outlining programs such as Acta, MindWrite, and MORE (or Word's Outline view) to store and catalog an art collection. Equipped with the organizational tools of the outliner, you can sort, search, hide, and/or display the art and then copy or print it.

HyperCard 1.2.5 stores only 72-dpi MacPaint bit maps, although you can use the Clipboard to transfer other images in PICT format. If that suits your needs, you can create a stack that holds your art and assign words and phrases so you can search through the collection by name. (A few vendors, such as Spinnaker and T/Maker, offer their MacPaint collections as HyperCard stacks.) Spinnaker's Plus and Silicon Beach's SuperCard go a step further, letting you store color PICT and PICT2 images and offering 8-bit-color painting and drawing tools to boot.

Clipboard and scrapbook utilities are a notch up the organizational scale. SmartScrap, from Solutions International, functionally replaces Apple's Scrapbook DA and offers expanded capabilities such as image naming, searching, thumbnail views, and the ability to select a portion of an image for copying. You can use the Option-Copy command to copy EPS art into SmartScrap and then paste it into any application that accepts PICT format. You can distribute your images among several scrapbook files and name them whatever you like. A companion

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a Slideshow feature that lets you browse through multiple files without opening and closing each one. Pattern Mover lets you copy and edit pattern palettes for MacPaint and FullPaint. When it comes to MacPaint clip art, WetPaint is one of the best values around.

ClickArt

★★★★

T/Maker's ClickArt is the oldest and best-selling clip art for the Mac. The ClickArt library currently consists of six MacPaint packages ($49.95 each) and three EPS offerings ($129.95 each). All the MacPaint packages include a HyperCard stack of the images and a DA called ClipOut that lets you open files, edit the images, and then paste selections into other applications. Although this isn't the most sophisticated MacPaint artwork on the market (Dubl-Click's WetPaint collections are arguably better), it serves most purposes quite well.

Business Images offers simple dingbat-type graphics such as arrows, logos, and flowchart symbols plus pictograms of people, animals, and equipment. Personal Graphics and Publications contain a variety of images in assorted art styles. They're a bit unfocused but could be useful for fliers, invitations, and newsletters. Publications includes some nice illustrated headlines and decorative alphabets. The Holidays collection covers the usual events, although it's not as complete as some other vendors' offerings. If you require religious art, take a look at the Christian Images collection ($59.95). T/Maker's latest — and finest — MacPaint release is Business Cartoons. All the images were drawn by award-winning cartoonist Phil Frank, who created the comic strips "Farley" and "Miles to Go," and they have a sophisticated, editorial-page look (below left). Subjects include people, office situations, finance, headlines, cartoon balloons, and monsters (our favorite).

On the EPS side, a majority of the images have sharp, clean lines, with judicious use of shading and fills. The graphics are not subgrouped, so you can't easily separate, say, a baby penguin from its mother. The images are also unnecessarily small, forcing you to enlarge them several times to do any editing. In addition, not all the images are opaque, leading to unexpected background bleed-throughs.

EPS Business Art has some 200 images, with the emphasis on office supplies, equipment, dingbats, and occupational symbols. There are few images of people or office settings, which could limit its usefulness unless you need pictures of staplers or fax machines. EPS Illustrations contains a smattering of everything, including a barbecue grill, coat hangers, and a Porsche. The newest collection is EPS Animals & Nature. This is a nicely done collection, although the image quality is uneven. Some drawings, such as those of a fish and a pig, are inexplicably crude, whereas others are superb renderings of plants and animals, both modern and prehistoric. The collection

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The new tools you'll find on the moveable Tool palette are: the Polygon Picture Box tool for multisided picture boxes and design elements; the Rotation tool for manual 360° rotation of objects; and the Zoom tool for enlarging or reducing the document view.

You can specify page view from 10% to 400% in .1-point increments. View percent can be specified in a field with mouse clicks or by clicking and dragging with the Zoom tool selected.

A variety of specifications—such as font, size, style, leading, location, angle of rotation—are displayed for text boxes, picture boxes, and lines. You can change values interactively on-screen without using a menu or dialog box.

Creating multiple-page documents is easy with a new palette that enables you to insert, delete, and move pages graphically by dragging page icons.

A pasteboard lets you position pictures and text off the page, create bleeds, and design multipage spreads up to 48" × 48".

Library palettes provide an easy way to store text and graphics. You can copy and paste or drag items from an open library onto a page and between open libraries.

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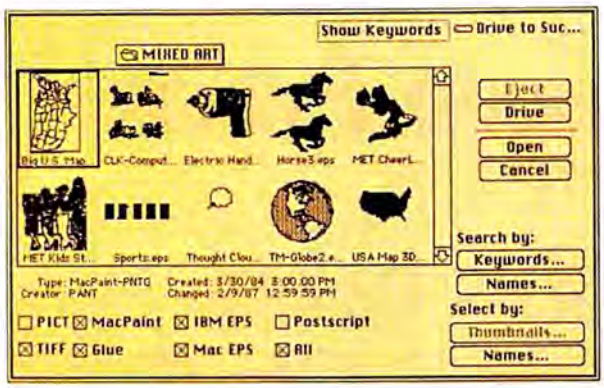

Figure 5: Feeling disorganized? A graphics-management utility such as Solutions' Curator catalogs your clip art — creating thumbnails of each image — and lets you search for images by filename, keyword, or thumbnail.

accessory, The Clipper, lets you precisely scale and crop a graphic before you add it to a layout. Olduvai's MultiClip is a hybrid of a clipboard and a scrapbook. The copied portion of a graphic is automatically stored in a clipboard that can hold multiple items. MultiClip's window shows thumbnail views of each stored item and works in the same way as a scrapbook does, letting you select a stored image and paste it into another application.

The most elegant way to organize clip art is to use a specialized cataloging program. The best-known of these is Solutions' Curator, which comes as both a DA and an application (see Figure 5). Curator creates a catalog that contains thumbnails of each image along with identifying data such as filename, image location, file type, and keywords. It recognizes the MacPaint, PICT, EPS (Mac and DOS versions), TIFF, PostScript, and SuperGlue formats and can perform some format conversions. You can search a Curator catalog by filename, keyword, or thumbnail view. As you acquire new artwork, you can add it to the catalog; a bundled program called Curator's Assistant can even catalog a disk unattended.

Two other programs worth a mention are Symmetry's PictureBase and Loop Software's PictureBook. Instead of storing thumbnails, these cataloging utilities save the actual images in their libraries. They don't support as many formats as Curator does, but they can automatically catalog scrapbook files as well as print a pictorial catalog of every image in the library. Also keep an eye out for Multi-Ad Search, a new cataloging and retrieval program from Multi-Ad Services. Due to ship in November, Search can compile a catalog of images from a broad range of sources. It stores any file format, including 32-bit-color images, and can display either thumbnails (in color) or actual images. Search works over a network, letting multiple users access a single library, and it's *fast* — a demo version retrieved 3,400 thumbnails in just two seconds.

Working with Bit Maps

Most MacPaint clip art contains multiple images in a single file. To extract single images, you need a painting program or utility (such as Dubl-Click's ArtRoundup or T/Maker's ClipOut) or you can import the entire file into your page-layout program and crop it to show just the

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also includes nature-inspired borders and dingbats plus images related to weather and the solar system.

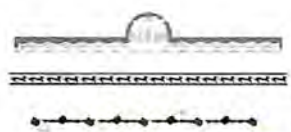
The ClickArt manuals contain image thumbnails (some images, particularly in the MacPaint collections, are almost too small to see) with helpful tips and an alphabetized index of filenames. Unfortunately, you frequently can't see all the subtleties of detail and shading, leading you to think the art is simpler than it really is.

Images with Impact: Accents & Borders

♦♦♦♦♦

3G Graphics has a reputation for producing high-quality EPS artwork, and its latest Images with Impact offering is no exception. Accents & Borders ($129.95) contains 270 design elements, including borders, frames, ornaments, and labels (mortises) plus symbols for education, entertainment, food, holidays, sports, and more. Many frames have matching ornaments, and there are five Designer Sets, each of which contains complementary bars, boxes, and tiles. (Minor semantic quibble: These elements are called borders, frames, and ornaments elsewhere in the collection.)

The illustrations are simply superb, with styles ranging from natural and historical to geometric and contemporary. The art is in crisp black-and-white, but registered users receive a color bonus disk with still more images, including a beautiful stained-glass border (bottom right) and some delightful fish and Christmas lights. All the images are



opaque, and most are strategically subgrouped, allowing you to separate them into still more elements or apply color to an entire related area simultaneously (all the leaves in a border, for example). You can easily resize continuous frames without affecting their thickness by removing chunks from their lengths and widths. The ornaments, like those that come in the first Adobe Collector's Edition, are extremely versatile and can serve as frame corners, brackets, dividers, or text accents.

A pictorial directory shows all the art printed at high resolution, and the excellent user's manual is loaded with tips and techniques for handling, combining, and customizing the art. There's even a section explaining the historical significance of the art styles. With Accents & Borders, 3G Graphics has once again scored a bull's-eye. The quality and variety of this package make it an unbeatable value.

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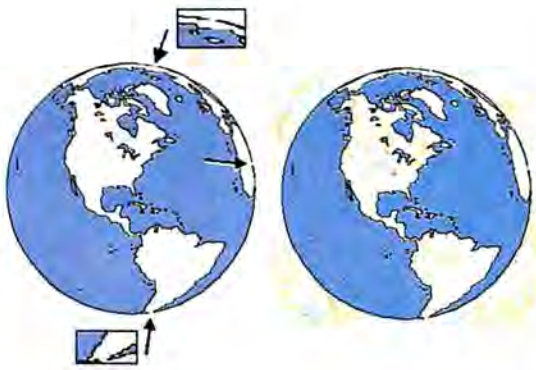

Figure 6: The white spaces of a bit-mapped image are transparent only if they are "open" to the outside. If you want a background image to show through an overlying bit map, cut channels that connect the white spaces you want to fill to the outside border of the bit map (left). Now place the bit map on top of the desired background. Notice how closed areas on the globe, such as Greenland, remain opaque (right). Finally, touch up the image to close the channels.

desired image. Editing bit-mapped art is simple with a painting program. To add or change elements, you use tools such as the pencil and paintbrush. You can eliminate unwanted sections with an eraser or background-colored paintbrush, or you can cut away parts with the selection tools. For general and specific techniques on working with bit maps — including tips on copying, scaling, and inverting images — check the manuals that come with your painting or clip-art packages. In the meantime, here are a few pointers on customizing your clip art:

Resolution. Resizing bit-mapped artwork is an iffy proposition. Stretching or enlarging a bit map can reduce the effective resolution, producing a blotchy, jagged image. To minimize distortion when resizing a bit map, scale it by a factor of 2 — that is, a 50-percent reduction in size or a 200-percent enlargement.

You can increase the apparent resolution of bit maps — and obtain sharper-looking images — by shrinking them in a page-layout package, word processor, or object-oriented drawing program. These programs effectively shrink the bit map's component dots, retaining all the original detail. To convert a 72-dpi MacPaint image to 144 dpi, for example, reduce the graphic's size by 50 percent. The drawback is that the image must stay shrunk for its dots to look smaller.

Printing options. Bit maps look best at their original size or when reduced or enlarged by a factor of 2. Because MacPaint images have a 72-dpi resolution, printing them at original size on a 300-dpi laser printer doesn't completely eliminate distortion. For optimum results, you need a resolution of 288 (72 x 4) dpi. To achieve this, print the image at 96 percent or check Precision Bitmap Alignment in the LaserWriter Options dialog box. Unfortunately, this scales the entire page, not just the bit map.

If you check the Smoothing option in the LaserWriter Page Setup dialog box, your bit-mapped images will look smoother, with fewer jaggies on curves and diagonals. Smoothed images do take longer to print, however, and sometimes small areas (such as patterns) fill in or contours look misshapen.

Combining bit maps. You can make any area of a bit map transparent by creating a one-pixel-wide tunnel to the outside (see Figure 6). This lets you create a transparent overlay for a second bit-mapped graphic. Use an object-oriented program to produce composite images containing several pieces of bit-mapped art. Page-layout, drawing, and presentation programs treat bit maps as free-floating objects, letting you rearrange individual elements without resorting to the tedious cut-and-paste routine.

Auto-tracing. A program with auto-tracing capabilities — such as Streamline, Canvas, or Illustrator — can turn your MacPaint or TIFF clip art into object-oriented PICT or EPS images. The auto-tracing process draws objects (lines or filled shapes) along the boundaries of the areas in a bit map. The traced image often has remarkable fidelity to the original. (For tips and techniques on auto-tracing, see "The Elements of Auto-Tracing," August '90, page 206.)

Editing Object-Oriented Art

In a collection of object-oriented clip art, each image usually resides in its own file, which simplifies the importing process. PICT and Illustrator EPS images can be edited down to the smallest detail, resized without distortion, and printed at a printer's best resolution. There's relatively little PICT clip art, so we'll focus on EPS images. Two measures of good-quality EPS artwork are object grouping and opaque images. Again, see your documentation for full details about working with object-oriented images.

Grouping. Most EPS images come grouped — that is, all elements are selectable as a single object — primarily so that sections don't tear off during handling. Some clip art contains discrete components that are *meant* to be ungrouped and used individually. For example, when a picture of a notepad and pen is ungrouped, you have two individually useful images. Grouping can also serve a second purpose: to organize elements of an image so that you can color them easily. If the leaves in a floral border are grouped, for instance, you can alter all their colors simultaneously, rather than tediously selecting and changing one leaf at a time. Grouping provides hidden value, because you're getting more usable art for your money; the disadvantage is that you need a PostScript editing program to ungroup and edit the images. 3G Graphics' collections are superb examples of intelligently grouped, multipurpose artwork (see Figure 7).

Opaque images. Better-quality EPS graphics are usually opaque, meaning that all white areas are actually filled with the color white instead of being transparent.

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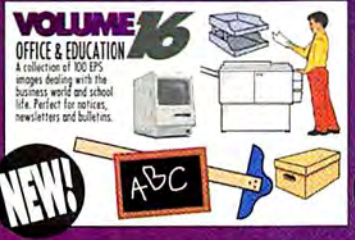

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PC DigitArt™ for PostScript output is compatible with PageMaker, Ventura Publisher or any other program that will accept EPS format graphics. The EPS version of PC DigitArt is fully editable with either Adobe Illustrator Windows or CorelDraw. DigitArt PC is available on the ArtRoom™ PC CD ROM or in the diskette packages shown above.

All Image Club DigitArt is now priced at $99 per volume. It is the same price whether you purchase Macintosh EPS or PC EPS format You can save even more by purchasing any two DigitArt volumes for only $168. Also, when purchased together, the set of volumes 1, 2 & 8 is available for a special price of $199.

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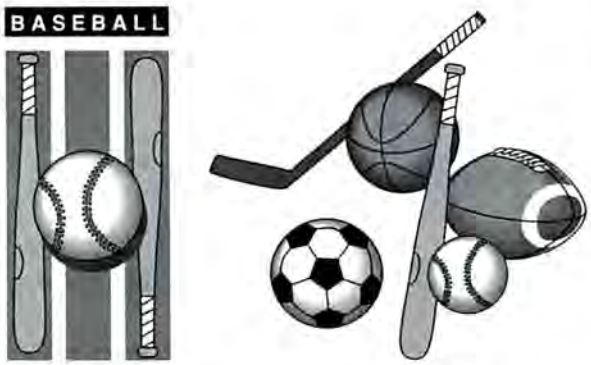

Figure 7: Subgrouped EPS files add versatility (and images) to your collection. Because all the elements in this baseball image are subgrouped (left), you can pull them apart, resize them, and combine them with other objects to create an entirely new graphic (right). This example is from 3G Graphics' Accents & Borders collection in the Images with Impact series.

This allows you to place an image on top of other page elements without the background's showing through. If an image is not opaque or has a few transparent elements, it may be due to shortcuts during the creation process. To check an image's solidity, place it on top of another object such as a gray-filled rectangle.

Masking. Sometimes you might want to hide or remove sections of an object-oriented image. If you have a drawing program and the art can be ungrouped, you're in luck. Another alternative is to mask unwanted portions with appropriately shaped objects. The precise technique depends on the graphic and on which program(s) you have. For simple masks or cropping, you can overlay areas with one or more white rectangles, ovals, or thick lines. A polygon tool lets you hand-trace most complex shapes with fine control. If your layout program has limited drawing capabilities, import the clip art into a drawing program and construct the mask there.

Backgrounds and fills. Some clip-art offerings are meant to stay, literally, in the background. Artbeats offers EPS backgrounds that fill a page at full size, or they can be scaled to fit everything from a postage stamp to a tabloid. In addition, the backgrounds can be cropped and masked to serve as fill patterns for other objects; Adobe also offers a complete package of fill textures. In general, place background items into a layout as late as possible so that you're not always dodging them to get your work done or waiting hours for printouts.

Backgrounds profoundly change the flavor of a layout, so test-print your work periodically. This is especially true for EPS backgrounds, because their preview images may look different from the PostScript output. Be sure that small text and objects don't get lost over background details; one solution is to place solid shapes on top of the background as backdrops for your text blocks.

EPS conversions. Many popular programs, including word processors, can't import EPS files directly. Fortunately, there are ways to convert an EPS image into PICT format, which is accepted by many more applications. Some graphics programs can import EPS and save as PICT, although you lose all PostScript data. A better alternative is to use the Option-Copy command. This workaround converts EPS images to PICT but retains all the PostScript information of the original EPS file, so that the image prints with full PostScript quality.

To create a PICT image with embedded PostScript, first open the EPS image in FreeHand or Illustrator and select it. Hold down the Option key, and choose Copy from the Edit menu (the keyboard shortcut won't work). This command copies both the PICT screen image and the PostScript data to the Clipboard and labels the combination as a PICT file. You can now paste this PICT/EPS image into another program or store it in the Scrapbook. The Curator and the PictureBook graphics-management utilities can also convert EPS images to PICT format with PostScript comments.

3-D Clip Art

Although 3-D clip art is versatile, it requires thoughtful handling. If you're placing a 3-D image into a layout that contains other art, be sure the montage looks cohesive. Light the 3-D scene so that its color, shading, and shadows match the surrounding artwork. Orient objects so that the perspective looks right. When you've finished editing, export the scene in the desired format but be sure to keep an editable 3-D version so that you can alter the image if necessary.

Additional Resources

Once you've found a promising clip-art candidate, contact the company for more information and ask for a catalog or pictorial index so you can see which packages contain the images you need. Compare price versus quality and quantity, and check to see which packages are discounted at mail-order houses.

Many companies provide a wealth of advice in their manuals, plus examples of the art in action. Adobe, Dynamic Graphics, 3G Graphics, and T/Maker are exemplary in this regard. You also might check out *Canned Art* (PeachPit Press, $29.95), a massive pictorial compendium that includes some useful tips.

Finally, Clip Art Window Shopper is a new on-line service from Adonis that lets you preview artwork from a variety of vendors and then download individual images (for a fee) or place orders for complete packages. The user link originally ran only under Microsoft Windows, but a Mac version should be available by now. For more information, contact Adonis at (800) 234-9497.

Senior editor Aileen Abernathy is *MacUser*'s resident DTP expert; contributing editor Salvatore Parascandolo is the graphics guru at Silicon Beach Software.

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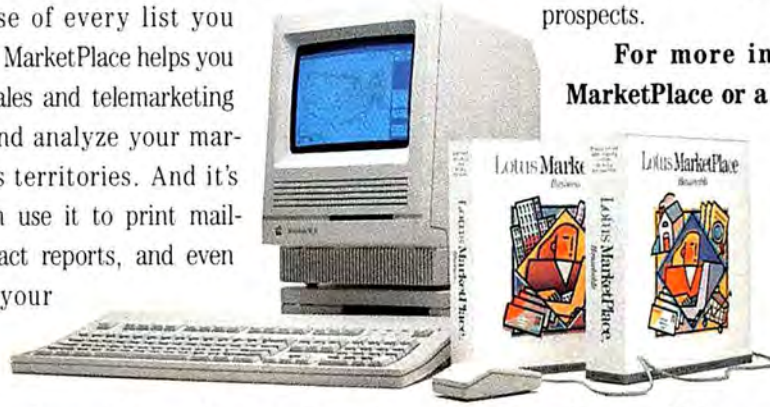

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Table 1: Features of Clip-Art Packages

	Adobe	Artbeats	C.A.R.	Casady & Greene
List price	Sym., Bor. & Ltr., $125 Patterns & Textures, $225	$79.95, $99.95, $129.95	$149.95 supplements, $65	$65
File format	Illustrator	EPS	EPS	EPS
Color images	no	no	no	yes
Comments	Collector's Editions offer basic graphic elements. Two packages: Symbols, Borders & Letterforms and Patterns and Textures. Excellent quality.	Superb, high-tech EPS backgrounds. 5 packages offer abstract, geometric, and natural images: Dimensions 1 and 2, Natural Images 1 and 2, and Potpourri. Also CD-ROM.	Clipables is a general-purpose library of 600+ images. Excellent price. Good image quality. Periodic supplements and CD-ROM in the works.	Vivid Impressions: Special Events contains 130 holiday and seasonal images, some in color, plus a cat alphabet. Much duplication. Good if you lack a graphics program.
Categories				
Animals			●	●
Arts/entertainment			●	●
Backgrounds/fills	●	●		
Borders	●			
Buildings/cities			●	
Cartoons			●	
Children			●	
Computers				
Dingbats/decorative	●		●	
Education				
Equipment/furnishings			●	
Flags			●	
Flowers/plants				●
Fonts (as graphics)	●			●
Food/drink			●	●
Government/presidents			●	●
Hands	●		●	
Historical				
Holiday/seasonal			●	●
Maps			●	
Money/finance			●	
Mortises/banners	●		●	
Occupations				
Office situations			●	
People			●	●
Phrases				
Religion				
Science/health			●	
Sports/recreation			●	
Symbols/icons/logos	●		●	
Tools/supplies			●	
Transportation			●	
Travel			●	
	Adobe Systems 1585 Charleston Road Mountain View, CA 94039 (800) 344-8335 (415) 961-4400	Artbeats P.O. Box 20083 San Bernardino, CA 92406 (714) 881-1200	C.A.R., Inc. 7009 Kingsbury St. Louis, MO 63130 (314) 721-6305	Casady & Greene P.O. Box 223779 Carmel, CA 93922 (800) 331-4321 (408) 624-8716

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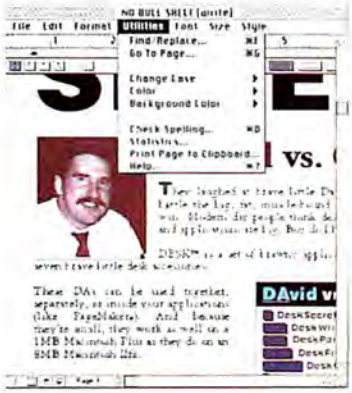
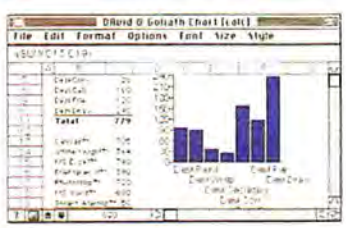


1. DeskWrite: This word processor comes with a spelling checker, find and replace, tabs, headers, footers, preview, envelopes, mail merge, text wrap around graphics, borders, and lots more.

2. DeskSecretary: A window pops-up on screen to remind you about important appointments, tasks, birthdays, etc. Set recurring intervals, early warnings, and even discreet messages.

3. DeskCom: The communication program lets you send and receive files, even when using other applications (with or without MultiFinder). Supports XModem protocol and Hayes® and Apple® compatible modems.

4. DeskFile: The database allows the entry of text, numeric, and graphic fields. Super-fast searches and sorts. Customize forms, labels, and lists. Import/export files from/to databases like Filemaker™ and 4th Dimension™.



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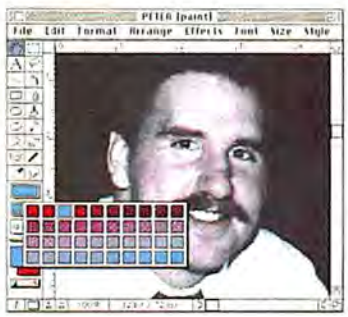

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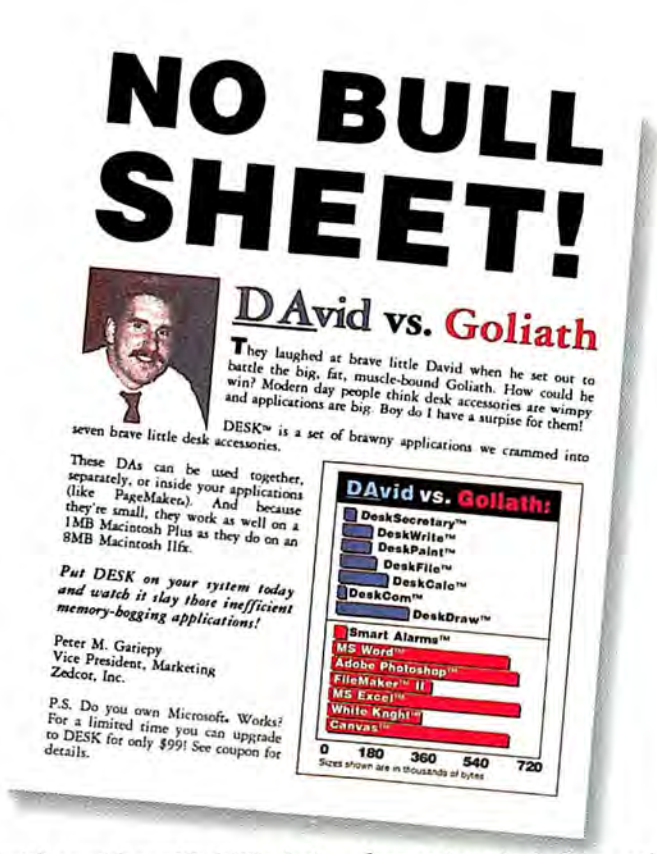

7. DeskDraw®: The draw program creates advanced drawings with variable line widths, fill patterns and colors, rotate text, and add arrowheads to lines. Save or load PICT files compatible with MacDraw™, SuperPaint™, and Canvas™.

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For a limited time, MS Works owners can upgrade to DESK. Send this completed coupon with the cover of your Works reference manual and $99 dollars plus shipping ($8 US, $16 Canada, $36 other). Arizona residents please add $6.93 sales tax. Limit one per customer. This offer expires December 31, 1990. No phone upgrades.

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ZEDCOR

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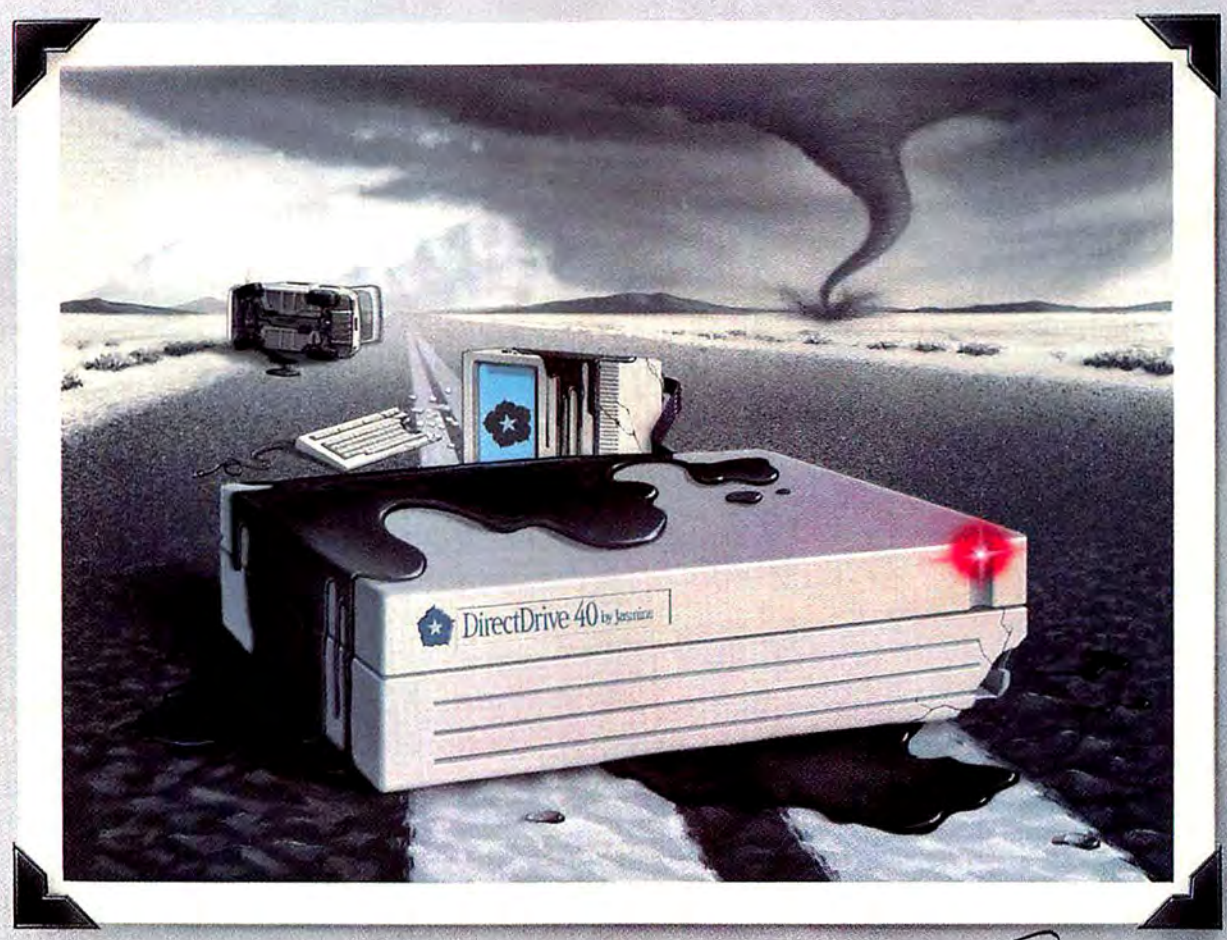

You Can Count on Jasmine!

Dear Jasmine Technologies,

Occasionally we win one.

On 11/15/89, as I was driving home from work, a tornado formed just to the west of me. I had enough time to pull into a safe parking lot and duck down. The "safe parking lot" turned out to be right in the path of the tornado. I was knocked out as the 200 MPH winds struck, flying my car—and me—nearly 300 yards. I woke up in the hospital with a severe concussion and blood loss. As part of the $250 million storm damage, my car was totalled and my computer was lost.

After I was released from the Hospital, my wife and I went to the Police Station where some "valuables" had been rescued from the disaster scene. There was my Macintosh SE with its Jasmine drive. The hardware was in sad shape; the front SE surface was bashed in, there was a big piece missing from the Jasmine Drive, and both were coated with a mixture of motor oil, antifreeze and water. The insurance company agreed that it was a total loss. But, realizing that the damage was finite, I began cleaning and straightening out everything. I jokingly powered up—IT WORKED! The bashed-in Jasmine drive booted the straightened out SE giving me a happy Mac, displaying the partitioned icons and sat there waiting! The clock was even right! So far, the drive has yet to fail.

I'm writing this letter (on the Jasmine drive) of appreciation to all of you in hope that you will be as pleased as I am that your products survived the forces of a major tornado that was blowing manhole covers around like frisbees. I don't have the foggiest idea where the drive ended up, but judging from all the junk coating it, it must have been found under one of the piles of destroyed cars.

In summary: the car was totalled, I was almost totalled, but the Jasmine drive made it O.K. Congratulations on making some darn good stuff. I plan to take the scarred hardware to work and continue to use it there as a reminder of one of the positive aspects of that unfortunate experience.

Sincerely,

Eugene K. Lawson

Gene Lawson

The New Jasmine...

For the last four years Jasmine has continuously been the leader in the Macintosh hard drive market. We're proud to announce that we are now a division of Chess, a dominant force in the European Macintosh market. With our new management we are producing the kinds of innovative products that we've become known for.

Look at the Service...

Jasmine's Platinum Flower Service is focused on our Customers. Over 25% of our staff is dedicated to Customer and Technical Support. Each Jasmine drive is thoroughly burned in and tested before shipping and we include informative manuals and detailed troubleshooting guides to help with any problems that may arise. If you're not satisfied with any aspect of your drive, you have 30 days* to return it for a full refund and, should your drive need help, the Platinum Flower line has a 2-year repair warranty.

Don't Take Our Word for it...

Jasmine Technologies has consistently finished first in the MacUser Labs' Buyers Guide and we've been praised in every major Macintosh publication for the quality of our drives and for the ease of use of DriveWare, our custom drive utility. Jasmine has earned more MacWorld and MacUser awards for Macintosh peripherals than all of our competitors combined.

Now, Consider the Alternatives...

Go ahead, check out the competition. We could use cheaper parts and have the same kind of "too good to be true" prices as some drive makers, but remember, if it sounds too good to be true, it probably is. We'd rather spend a little more, *not* cut the corners, and produce a premium drive at a non-premium price. We've set the standards and we will continue to lead the industry now and in the future. Simply put, there is no substitute for the best.

The Jasmine Edge...

A 70,000 hour meantime between failures. A noiseless fan with a filter. Two surge protected AC outlets and two power fuses. A SCSI select switch and two-color LED.

DriveWare, our drive utility, provides the best SCSI partitioning, password protection, error correction, diagnostic and help software.

Platinum Flower includes two award-winning utility software packages with every drive (Sum II and Virex) plus over 10 megabytes of Shareware and Freeware programs.

Blue Line	
Capacity	**Price**
40 MB	$399
80 MB	$499

Platinum Line	
Capacity	**Price**
40 MB	$499
90 MB	$699
180 MB	$999

Jasmine
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Table 1: Features of Clip-Art Packages, continued

	Dream Maker		Dubl-Click	Dynamic Graphics		Electronic Pen
List price	Cliptures, $129.95 MacGallery, $49.95		$79.95 each MacTut, $49.95	$74.95 each subscription, $49.50		$250
File format	MacPaint, EPS		MacPaint	MacPaint, EPS		EPS
Color images	no		no	no		no
Comments	Cliptures EPS series has 2 packages on business and 1 on sports. MacGallery is a whimsical, child-oriented collection of MacPaint images.		WetPaint series has 10 volumes of well-drawn MacPaint images, many with an "antique" look. 2 DAs for editing images and moving patterns.	DeskTop Art series has theme packages; 20 are EPS and 8 MacPaint. Relatively few images for price. Fair image quality. Also subscription service.		The Visual Arts offers 10 MB (300+ images) of art. General-purpose package. Some images have air-brushed look. Phoenix utility lets you do basic image adjustments.
Categories	MacPaint	EPS		MacPaint	EPS	
Animals	●		●	●		
Arts/entertainment			●	●	●	●
Backgrounds/fills						●
Borders	●		●	●		●
Buildings/cities	●		●	●		
Cartoons		●	●	●	●	
Children	●		●	●	●	
Computers	●	●	●		●	●
Dingbats/decorative	●		●	●		●
Education			●	●	●	
Equipment/furnishings			●		●	●
Flags			●			●
Flowers/plants	●		●			●
Fonts (as graphics)			●			●
Food/drink	●		●	●	●	●
Government/presidents	●			●	●	
Hands	●	●	●		●	●
Historical	●		●	●		
Holiday/seasonal	●		●	●	●	
Maps	●		●			
Money/finance	●	●	●	●	●	●
Mortises/banners	●	●	●	●	●	●
Occupations		●	●	●		
Office situations		●	●	●	●	
People	●	●	●	●	●	●
Phrases	●		●		●	●
Religion	●		●	●	●	
Science/health			●	●	●	
Sports/recreation	●	●	●	●	●	●
Symbols/icons/logos		●	●	●	●	●
Tools/supplies		●	●	●	●	●
Transportation		●	●	●	●	●
Travel			●		●	
	Dream Maker Software 4020 Paige St. Los Angeles, CA 90031 (213) 221-6436		Dubl-Click Software 18201 Gresham St. Northridge, CA 91325 (818) 349-2758	Dynamic Graphics 6000 N. Forest Park Drive P.O. Box 1901 Peoria, IL 61656 (800) 255-8800 (309) 688-8800		Electronic Pen 4131 Cimarron Drive Clarkston, GA 30021 (404) 296-8623

The floppy disk icon "DOS-1.44M" is actually an MS-DOS® disk, brought to you by AccessPC.™

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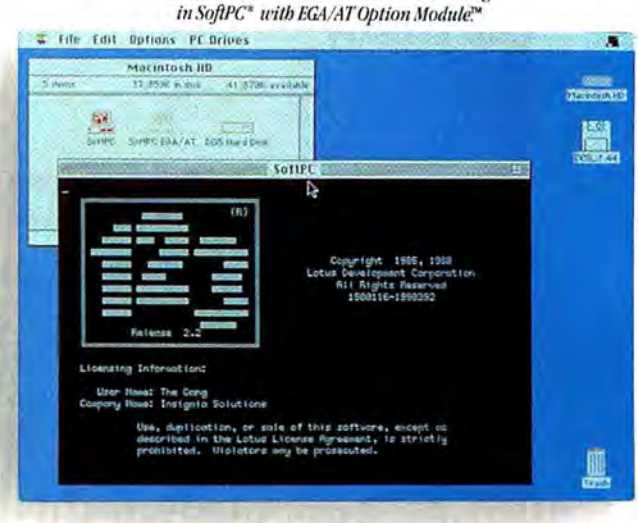
Shown: Lotus® 1-2-3® release 2.2, running in SoftPC® with EGA/AT Option Module.™



Click Click, It's A MAC And A PC.

Load SoftPC, click twice, and you've got a window wide open to the entire MS-DOS world. Everything a Mac can do plus everything a PC can do, in one machine.

Whether you're a Macintosh user who needs access to PC software and data, or a PC user who wants to go Macintosh without losing PC compatibility, you can have it all with Insignia's best-selling software solutions.

SoftPC is a software emulation precise enough to run the toughest PC applications—Norton Utilities, Lotus 1-2-3, Harvard Graphics, AutoCad, even custom development programs. You get *complete* XT or AT compatibility for the SE/30, Macintosh II family and the Macintosh Portable.

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Table 1: Features of Clip-Art Packages, continued

	Enabling Technologies	Image Club Graphics	Metro ImageBase	Multi-Ad Services
List price	$99 each	$99 each ArtRoom CD-ROM, $79	$145 each	ProArt, $139 PAL Potpourri, $189.95
File format	Pro3D (exports others)	EPS, PICT	TIFF	EPS
Color images	yes	no	no	no
Comments	Clip3D series has 8 theme packages of 3-D artwork, including Fonts, People, Geography. Color images. Fair quality. Bundled 3-D utility for editing images. No pictorial index.	Digit-Art has 20 volumes of EPS art; some PICT. Various themes. Stylized, hip look is often cartoonish. Good quality. Nice blends. CD-ROM has all packages plus fonts and templates.	14 packages (100 images each) of 300-dpi TIFF images. Large files, must be unstuffed before use. Traditional, hand-drawn look seen in newspapers. Also on CD-ROM.	ProArt series has 8 theme volumes, 100 images each. PAL Potpourri has 300 images. Newspaper-ad look. Various CD-ROM subscription services available.
Categories				
Animals	●	●	●	
Arts/entertainment	●	●	●	●
Backgrounds/fills		●		
Borders	●	●		●
Buildings/cities		●	●	●
Cartoons		●	●	
Children		●	●	●
Computers	●	●	●	●
Dingbats/decorative	●	●		
Education	●	●		
Equipment/furnishings	●	●	●	●
Flags				
Flowers/plants	●			
Fonts (as graphics)	●	●		
Food/drink	●	●	●	●
Government/presidents		●		●
Hands	●	●	●	
Historical			●	
Holiday/seasonal	●	●	●	●
Maps	●	●		
Money/finance	●	●	●	●
Mortises/banners	●	●	●	●
Occupations	●	●	●	●
Office situations		●	●	●
People	●	●	●	●
Phrases	●	●		●
Religion				●
Science/health	●		●	
Sports/recreation	●	●	●	●
Symbols/icons/logos	●	●		●
Tools/supplies	●	●	●	●
Transportation		●	●	
Travel		●	●	●
	Enabling Technologies 600 S. Dearborn Suite 1304 Chicago, IL 60605 (312) 427-0386	Image Club Graphics 1902 Eleventh St. S.E., #5 Calgary, Alberta T2G 3G2 Canada (800) 661-9410 (403) 262-8008	Metro ImageBase 18623 Ventura Blvd. Suite 210 Tarzana, CA 91356 (800) 525-1552 (818) 881-1997	Multi-Ad Services 1720 W. Detweiller Drive Peoria, IL 61615 (800) 447-1950 (309) 692-1530

Enter a New Dimension in Color Graphics!

Here at Animas, our primary objective is to design innovative, easy-to-use products. From the first conceptual drawing to the finished product, our focus is always on *quality*. Take, for example, our Animas True-Color Hand Scanner. It's clearly the most revolutionary scanner on the market today at any price (just ask anyone who saw it at the MACWORLD Expo in Boston). And because we believe in promoting lower prices for the Macintosh masses, we are bringing it to you at the incredible price of $599.00! Look at the long list of features below:

Features:

- Animas True-Color Hand Scanner (Scan Width 4.1 inches)
- SCSI Interface with SCSI Cable
- ColorScan MacCheese Software (Suggested Retail $149.00)
- Automatic gamma correction
- Read It! OCR Software by OLDUVAI Corp. (Suggested Retail $295.00)
- 100-400 DPI selectable in increments of 10 DPI in dithered mode
- 200 DPI in halftone mode
- 16.7 million colors
- Scanning speed: 3.5 ms/line

The only questions you should have now are:

How can they sell it at such a low price?

Where can I get one?!

animas

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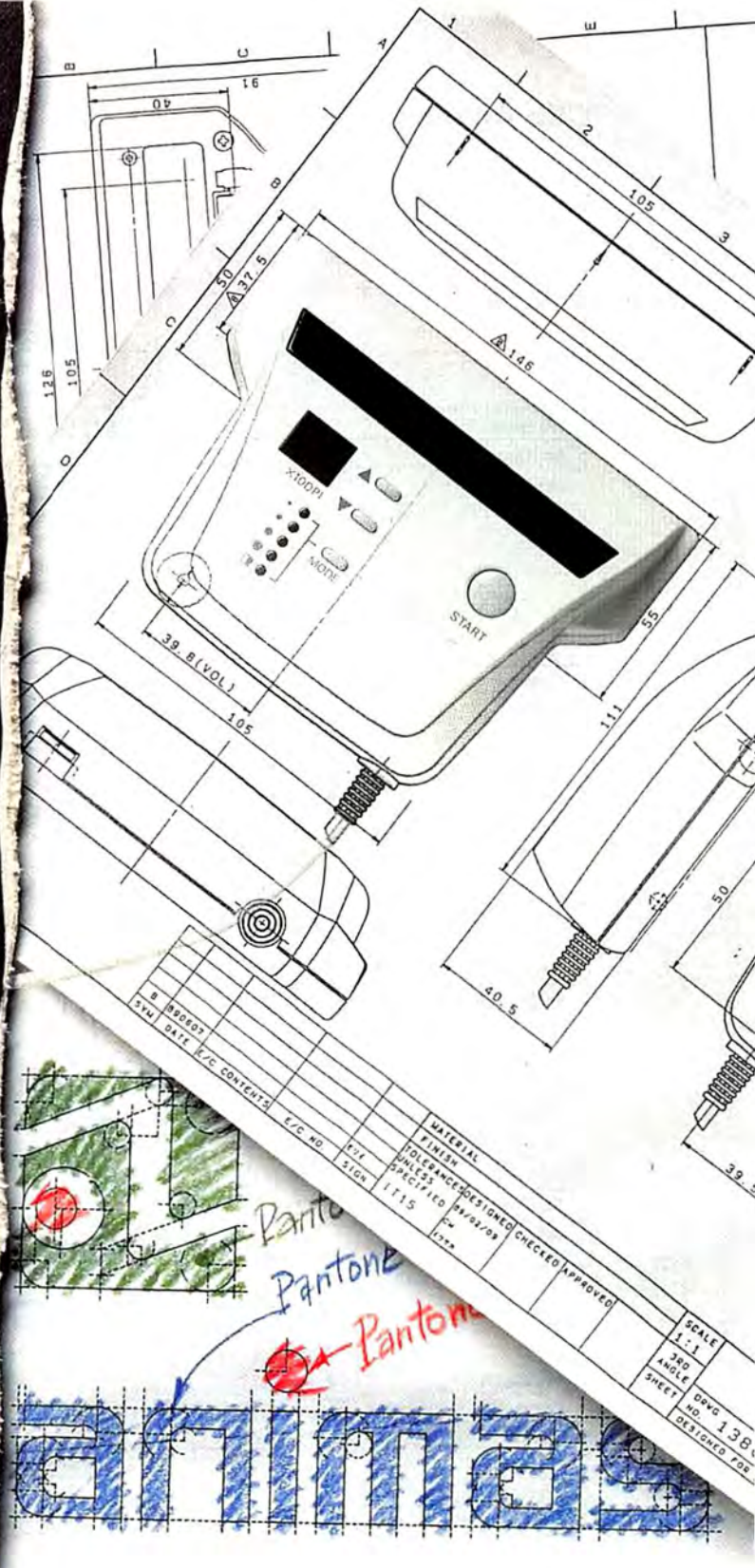

Limited Offer!

To prove we mean what we say about lower prices, if you circle our number on the reader response card to request more information on our products (trackballs, hard drives, digitizing tablets, etc.), we'll include a coupon for $100.00 off our already too-low-to-be-believed price of $599.00 (Offer good on Animas True-Color Hand Scanner only.)-Remember-your reader response card must be filled out and postmarked no later than November 30th, 1990 to take advantage of this offer!

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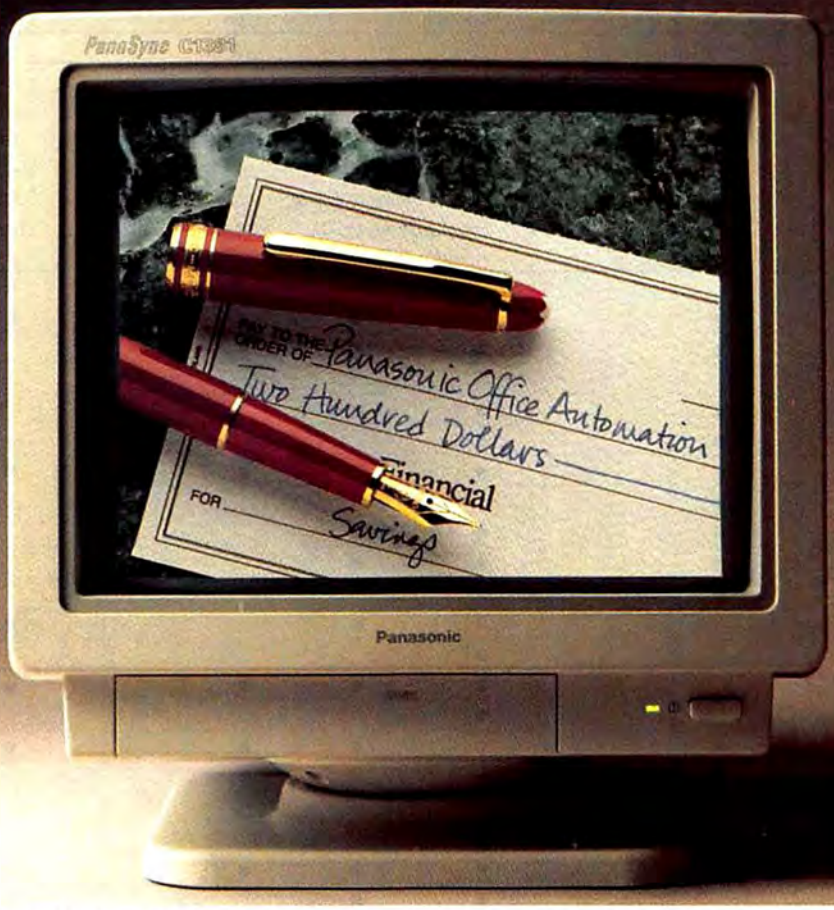
Table 1: Features of Clip-Art Packages, continued

	Paracomp	Spinnaker Software		Studio Advertising Art	Tactic Software
List price	$129.95	MacPaint pkgs., $49.95 EPS pkg., $99.95		$395	First Edition, $99 Second Edition, $129
File format	Swivel 3D (exports others)	MacPaint, EPS		EPS	EPS
Color images	yes	no		no	no
Comments	SwivelArt has color 3-D art in 4 categories: maps, fonts, equipment, symbols. Good quality. Includes run-time version of Swivel 3D for editing. HyperCard stack for making 3-D words.	Works of Art series has 3 MacPaint packages (Education, Assortment, Holiday) and 1 EPS (Business). Fair image quality. Lots of MacPaint images for price.		Click & Clip 500 has 500 EPS images. General-purpose collection. Most images are simple line art. Fair quality. Expensive. Additional images issued quarterly.	ArtClips has 2 packages. First covers graphics and symbols; second focuses on business images. Odd assortment of images. Pricey. Average quality. Includes ArtSymbol font.
Categories		MacPaint	EPS		
Animals		●		●	●
Arts/entertainment		●	●	●	●
Backgrounds/fills					
Borders	●			●	
Buildings/cities		●	●	●	
Cartoons		●		●	
Children		●			
Computers	●	●	●	●	●
Dingbats/decorative	●	●	●	●	●
Education		●			
Equipment/furnishings	●	●		●	●
Flags					
Flowers/plants		●			
Fonts (as graphics)	●				
Food/drink		●		●	●
Government/presidents		●	●		
Hands					
Historical		●			
Holiday/seasonal		●	●	●	
Maps	●	●	●	●	●
Money/finance		●	●	●	●
Mortises/banners		●		●	●
Occupations		●			●
Office situations	●	●	●		
People		●	●	●	●
Phrases		●		●	●
Religion		●			
Science/health		●		●	
Sports/recreation		●	●	●	●
Symbols/icons/logos	●		●	●	●
Tools/supplies	●	●	●	●	●
Transportation	●	●	●		●
Travel		●	●	●	
	Paracomp, Inc. 1725 Montgomery St. Second Floor San Francisco, CA 94111 (415) 956-4091	Spinnaker Software 201 Broadway Cambridge, MA 02139 (800) 826-0706 (617) 494-1200		Studio Advertising Art P.O. Box 43029 Las Vegas, NV 89116 (702) 641-7041	Tactic Software 11925 S.W. 128th St. Miami, FL 33186 (800) 344-4818 (305) 378-4110

Introducing the PanaSync™ C1381 Monitor.

High resolution. Low price.



If you want clarity, brightness, and terrific contrast, and you've resigned yourself to paying a premium of hundreds of dollars to get it, you'll find our newest monitor pleasant viewing indeed.

The PanaSync C1381 gives you sharp color graphics, with 0.28 dot pitch. And virtually infinite color resolution.

And it's a masterpiece of ergonomics. With front-mounted controls, tilt/swivel stand, plus a non-glare tinted black-matrix screen.

You'll find the PanaSync as comfortable with a Mac II color graphics board as it is with an IBM-compatible running VGA, SuperVGA or 8514/A graphics boards.*

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PanaSync™ Multiscanning Color Monitors.

* *An optional cable is required for Macintosh. Macintosh is a registered trademark of Apple Computer, Inc. VGA, and 8514/A are trademarks of International Business Machines Corp. IBM XT, AT and PS/2 are registered trademarks of International Business Machines Corp.*

M3-MAC

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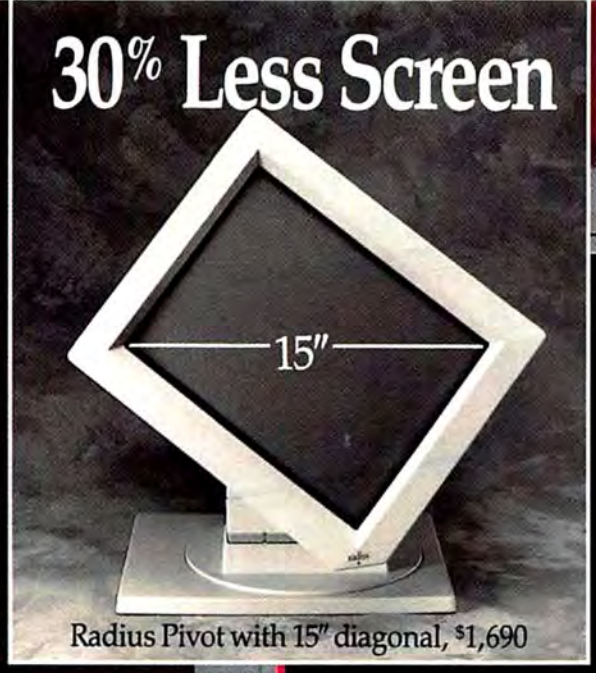
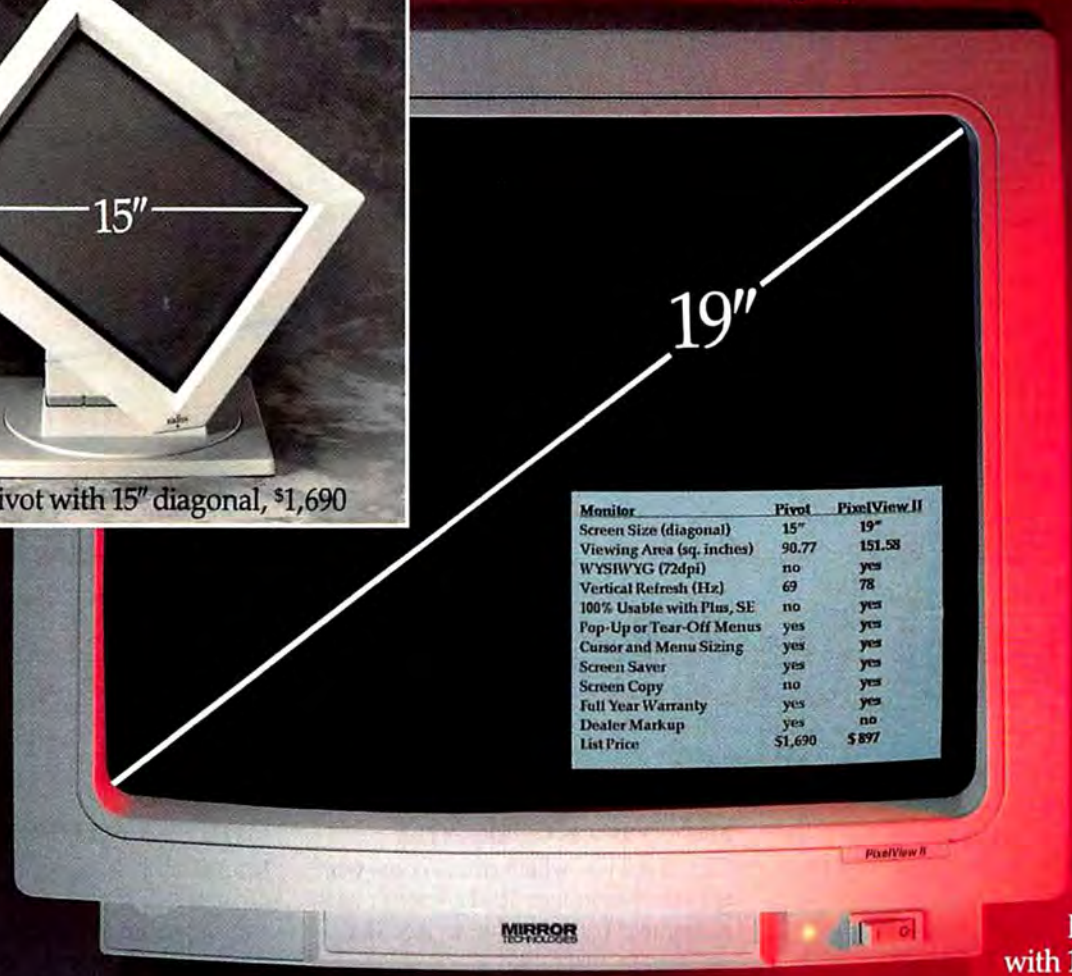
Table 1: Features of Clip-Art Packages, continued

	3G Graphics	T/Maker		Totem Graphics	Wheeler Arts	
List price	$99.95, $129.95	MacPaint pkgs., $49.95 EPS pkgs., $129.95		$95 each (category, $125) all 12 volumes, $895	$34.95 each	
File format	EPS	MacPaint, EPS		EPS	MacPaint, EPS	
Color images	yes (bonus disk)	no		yes	no	
Comments	Images with Impact has 3 packages of superb art: Graphics & Symbols, Business, and Accents & Borders. Beautifully drawn images. Subgrouped for easy editing.	ClickArt series offers 6 MacPaint and 3 EPS packages with various themes. Good quality. MacPaint packages include HyperCard stack and DA for editing images.		12 packages/categories of superb color EPS art. Excellent image quality overall (human drawings are weak point). Great use of color blends. Prints fine in black-and-white.	Quick Art series has 4 EPS Folios (20 – 25 images each), 5 MacPaint (300 images each). Mostly agricultural themes (food, plants, farm). Good image quality. Pricey EPS packages.	
Categories		MacPaint	EPS		MacPaint	EPS
Animals	●	●	●	●	●	●
Arts/entertainment	●	●	●	●		●
Backgrounds/fills						●
Borders	●	●	●			
Buildings/cities	●	●				
Cartoons	●	●		●	●	
Children	●					
Computers	●	●	●			
Dingbats/decorative	●	●	●			
Education	●					
Equipment/furnishings			●		●	
Flags		●				
Flowers/plants		●	●	●	●	●
Fonts (as graphics)		●				
Food/drink	●	●	●	●	●	●
Government/presidents	●	●		●		
Hands	●	●				
Historical		●				
Holiday/seasonal	●	●	●	●	●	●
Maps		●	●		●	●
Money/finance	●	●	●			
Mortises/banners	●	●	●		●	●
Occupations	●	●	●			
Office situations	●	●	●			
People	●	●	●	●	●	
Phrases	●	●				
Religion	●	●		●		
Science/health				●		●
Sports/recreation	●	●	●	●		
Symbols/icons/logos	●	●	●			
Tools/supplies	●	●	●	●		●
Transportation	●	●	●			
Travel	●			●	●	
	3G Graphics 11410 N.E. 124th St. Suite 6155 Kirkland, WA 98034 (206) 367-9321	T/Maker Co. 1390 Villa St. Mountain View, CA 94041 (415) 962-0195		Totem Graphics 5109-A Capitol Blvd. Tumwater, WA 98501 (206) 352-1851	Wheeler Arts 66 Lake Park Champaign, IL 61821 (217) 359-6816	

30% Less Screen



47% Le$$ Green



$897
PixelView II
with 19" diagonal

"Our PixelView II delivers more sharp, clear image for less!"

THE PIXELVIEW IS MORE DISPLAY - When our marketing department first laid eyes on the Radius Pivot, we all agreed it was one sexy design. Then, our engineers reminded us that the Radius had 1/3 less screen, yet cost nearly $800 more (they went on to calculate the cost per square inch; $6 on the PixelView versus $18 for the Pivot . . . 300% more). And, our PixelView II, they noted, is true WYSIWYG and doesn't require software that severely patches the Macintosh system just to pivot.

WORKS WITH MORE MACS - Both displays work on the Mac II and SE/30, but the PixelView II also works on the Mac Plus and SE*.

OUR 19" TAKES UP LESS DESK SPACE THAN THEIR 15" - Our engineers explained that while pivoting, the Radius requires over 20" clearance (and forget about leaning anything up against one).

$800 LESS - Our engineers summed it up, "Are we buying productivity or sexy design? What the customer really needs is a monitor with a big, bright, clear image. And the PixelView II delivers more of that for less. Much less."

If desk space or budget are tight, get our 15" PixelView I $567

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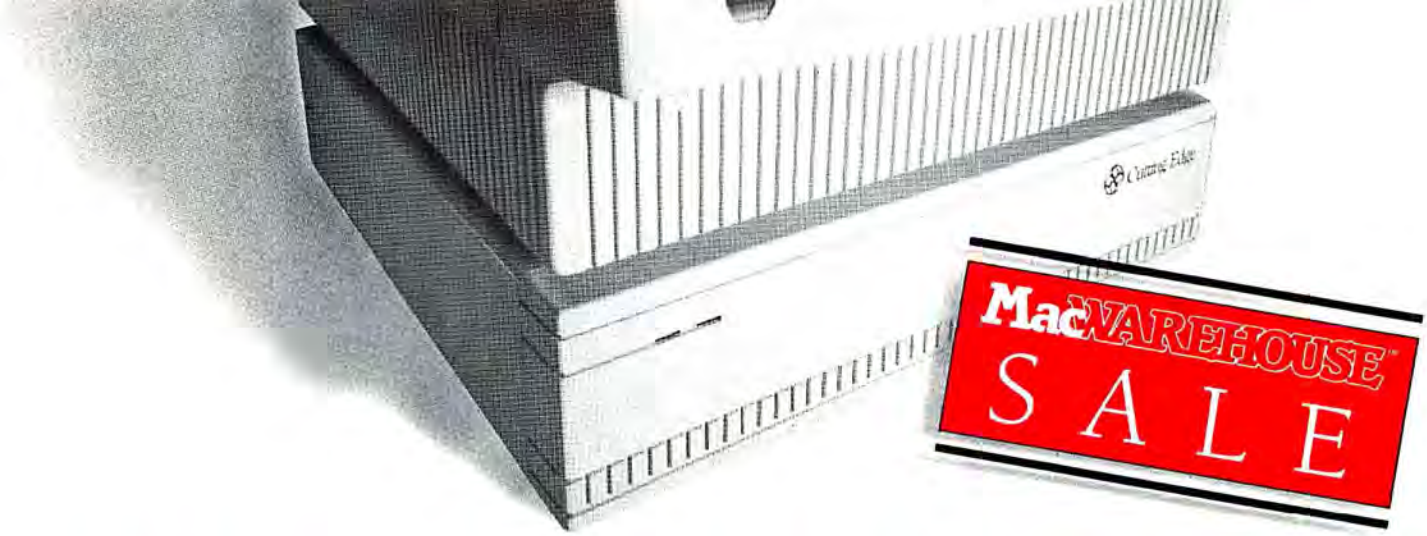
* The Pivot can operate in the portrait mode only on the Mac Plus and SE.

PixelView is a registered trademark of Mirror Technologies, Inc. All other trademarks and tradenames belong to their respective holders. Comparisons made on 7/20/90.



If You Can Find A Better Deal In Hard Drives . . .

Between now and October 31st, MacWarehouse is offering savings on every hard drive we sell. So, if you're thinking of buying a new hard drive, your timing couldn't be better. Check out our sale prices and your savings, compared to our December 1989 prices, in the chart.

We offer drives by leading manufacturers like Cutting Edge, C.M.S., Quantum, Power User, PLI Infinity Turbo and others — all at unheard of low prices.

Let our helpful sales staff take the hassle out of buying a drive. They'll tell you which drive

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MONEY BACK GUARANTEE

They'll tell you which drives come with the MacWarehouse 30-day money back guarantee. Try one at home. And if, for any reason, you're not 100% satisfied, just return it to us within thirty days and we'll refund your money.

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READY TO USE

A hard drive from MacWarehouse couldn't be easier to use. We'll tell you which ones come pre-formatted — ready to use right out of the box. You just plug in, turn on your Mac and go!

If you do need any help, the MacWarehouse Technical Support staff is standing by our toll-free lines to assist you.

LIMITED TIME OFFER

MacWarehouse sale prices, based on capacity, are shown in the chart. Also shown are the savings from pre-holiday prices. (This is a limited time offer, valid through October 31, 1990.) Overnight delivery is just $3, anywhere in the Continental United States.

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	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE	SALE PRICE	YOU SAVE
Cutting Edge	309	$100	379	$120	435	$114	469	$160	529	$210	679	$210
CMS, MacStack	429	$100	499	$46	589	$36	649	$50	769	$30	839	$36
Power User	319	NEW	369	NEW	409	NEW	469	NEW	509	NEW	669	NEW
PLI, Infinity Turbo	–	–	569	$20	619	$26**	–	–	–	–	999	$120
*Quantum Internal	–	–	–	–	399	$126	–	–	649	$220	–	–

Savings are calculated from MacWarehouse December 1989 published prices. *Quantum drives are for internal installation and require a 3.5 Internal Drive Kit for $75 **PLI is a 50meg turbo drive. ***40 + meg Removable Cartridge Drives come with 1 cartridge. Additional cartridges available.

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Many of our drives come with the MacWarehouse 30-Day Money Back Guarantee. If, for any reason, you're not completely satisfied, call us within thirty days of receipt for a return authorization number and full refund of the purchase price.

MULØD

Tomorrow's Upgrade For Your Mac Is Only $69*

FREE! STEP-BY-STEP VIDEO INSTRUCTIONS**

A MacWarehouse Memory Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable, overnight service will have your Kit in your hands tomorrow!

MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spread-sheet. Install extra memory and you can leave your letter open while you refer to last month's sales figures. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. Just open your Mac, slide out the main circuit board and plug in your SIMMs. Our FREE video will give you STEP-BY-STEP installation instructions. Every type of Mac is covered and we think we've made it a breeze.

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2@$69each).

The chart explains exactly what you need to achieve the desired level of performance.

To upgrade a 4-socket Mac Plus or SE to this amount of memory	Do this: (install in multiples of two only)
2 MB	Remove all four existing 256K SIMMs, install two 1M SIMMs, leave two sockets for future expansion.
2½ MB	Remove only two 256K SIMMs, install two 1M SIMMs.
4 MB	Replace all four 256K SIMMs with four 1M SIMMs.
To upgrade an 8-socket Mac II, IIx, IIcx, or SE30 to this amount of memory	**Do this: (install in multiples of four only)**
4 MB	Remove all four existing 256K SIMMs, install four 1M SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256K SIMMs, install four 1M SIMMs in remaining sockets.
8 MB	Remove all four 256K SIMMs install eight 1M SIMMs.

To open your Mac Plus or SE, you'll need a specially designed tool – it's available from us as part of a handy tool kit for just $9.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMS (Single In-line Memory Modules). Each one megabyte SIMM card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.

Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 120 ns SIMMS is $69. Please call for the very latest prices and availability. Our sales staff will tell you what you need and help make your choice an easy one.

SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100 ns chip. The original Mac used relatively slow 150 ns memory chips. The 68020 processor needs 120 ns (or faster) chip, and the 68030 Macs like the speedier model.

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Place your order by 12:00 a.m.(E), weekdays and we'll deliver overnight for just $3.00. There's never been a better time to consider a memory upgrade. Call our toll-free number now and tomorrow morning your Mac will be off to a brand new start.

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If, for any reason, you are dissatisfied with your MacWarehouse Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return the product, postage paid, in its original condition, with the original packaging and documentation.

ONE YEAR WARRANTY. MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion.

MULØP

* SIMMs prices vary. Call for latest information.
** Limited Offer! Free video with purchase of 2 or more SIMMs.

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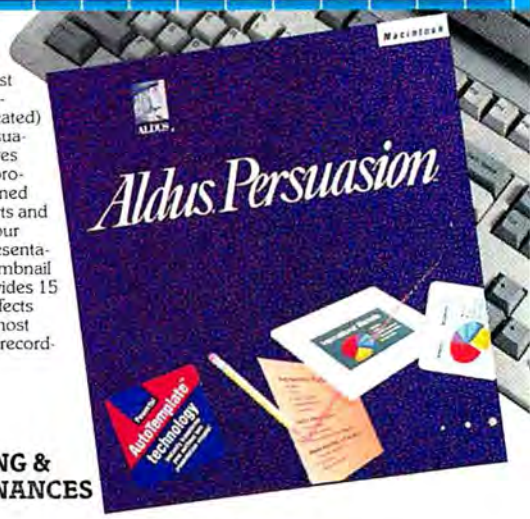
A powerful precision drawing tool for scaled drawings, illustrations, presentations and general purpose graphics. Includes an array of drawing tools and advanced illustration features like parallel line tool, extend lines to intersection, glue and unglue, trim tool, fillet tool, true associative dimensioning and optional keyboard editing. **$319.**

Dreams Business Graphics Library.
Professionally drawn vector images provide high quality PostScript® printing. Images can be re-sized, edited and/or colored, such as the image shown, then copied and pasted into drawing, word processing or page layout programs. (graphics). **FREE with purchase of Dreams.**

Persuasion 2.0 (Aldus)
Persuasion 2.0 takes the work out of developing presentation graphics. Just type your ideas into a Predefined (or personally created) outline template and Persuasion automatically prepares your slides. Persuasion provides a variety of pre-defined (or create your own) charts and graphs and can format your speech to match your presentation, complete with a thumbnail image of each slide. Provides 15 different wipe/dissolve effects and includes drivers for most popular printers and film recorders. (business). **$329.**



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American Power Conversion
110 SE UPS ..... 219.
370 ci UPS ..... 349.
Apple
Toner Cartridge - Laser Printer II ..... 105.
Basic Needs, Inc.
HardTops Keyboard Covers ..... 15.
Keyboard Flip ..... 6.
Dust Covers - Grey Nylon Ripstop
Mac II and extd. keyboard ..... 12.
Mac IIcx/ci Monitor Stand ..... 47.
Universal Laser Printer Stand ..... 28.
Utility Pac ..... 11.
Computer Giftware
Mouse Pads ..... starting at 12.
Curtis
Command Center ..... 89.
Computer Tool Kit (52 pc.) ..... 49.
Ergotron
MacTilt-SE ..... 68.
MacTilt II-RGB ..... 75.
I/O Design
Imageware II Carrying Case ..... 49.
Macinware IIcx Carrying Case ..... 85.
Macinware Mac II Carrying Case ..... 99.
Macinware Plus Carrying Case ..... 64.
Macinware SE Carrying Case ..... 75.
Monitorware Apple RGB Case ..... 79.
The Ultimate SE Carrying Case ..... 79.
The Neon Ultimate Carrying Case ..... 89.
Kensington
Anti-Glare Filter ..... 32.
Apple Security System ..... 34.
LaserWriter II Security System ..... 34.
MasterPiece Mac II ..... 105.
PowerBacker 360 UPS Line ..... 269.
SE Radiation Shield ..... 52.
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Mobius Products
Fanny Mac QT ..... 55.
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Targus, Ltd.
Deluxe Plus/SE-XKB Case (black) .... 69.
ImageWriter II Case (black) ..... 45.
Mac Plus/SE Case (black) ..... 55.
IIcx /IIci Case ..... 75.
Premier Leather Case ..... 175.

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Computerized Classic Accounting ..225.
Inman Software
Business Sense 1.3 ..... 175.
Intuit
Quicken 1.5 ..... 35.
Layered, Inc.
at Once! ..... 285.
MECA
Managing Your Money ..... 145.
Nolo Press
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WillMaker 4.0 ..... 39.
Reality Technologies
Wealthbuilder ..... 165.
Softsync, Inc.
Accountant, Inc. Professional ..... 345.
Survivor
MacMoney 3.5 ..... 59.

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DS/DD (box of 10) ..... 14.
DS/High Density (1.44 Meg) ..... 24.
Sony
DS/DD (box of 10) ..... 13.
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Turn your Mac into a sophisticated photo lab with Digital Darkroom 2.0. Digital Darkroom is the software solution for your gray-scale image processing needs. A highly intuitive user-interface combined with "intelligent" image manipulation tools provide an ideal environment for retouching, enhancing and composing scanned photographs and other bitmapped graphics. New features include image/scanner/printer calibrations, real-time transformations, colorization, image composition controls, sophisticated painting tools, precise layout environment, multiple open documents and tear-away/collapsible palettes. (graphics). **$248.**

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AEC Information Manager ..... 409.
Ashton-Tate
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Claris
FileMaker Pro ..... 218.
Fox Software
FoxBASE+/Mac 2.0 ..... 292.
Odesta
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Software Discoveries
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Calculator Construction Set v. 2.0 ..... 45.

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Vision Software
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QuarkStyle ..... 189.
XPress 3.0 ..... 529.
Spinnaker
Springboard Publisher II ..... 109.
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CompuServe Subscription Kit ..... 23.
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MAcKNOWLEDGE ..... 85.
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The sky's the limit with Fokker Triplane, the classic WWI flight simulator. Now in full color. Battle Sopwith Camels, down observation balloons, drop bombs on enemy runways then return safely home. Fokker Triplane, like no other simulator, captures the thrill of open cockpit flying. **$23.**

FastLabel 2.0
Stick it to the chore of simple label printing in three easy steps! Import addresses, lists and graphics then use FastLabel's preformatted templates (or create your own) to produce everything from disk, V.C.R. and cassette labels to name badges, signs and more. **$89.**

FastEnvelope
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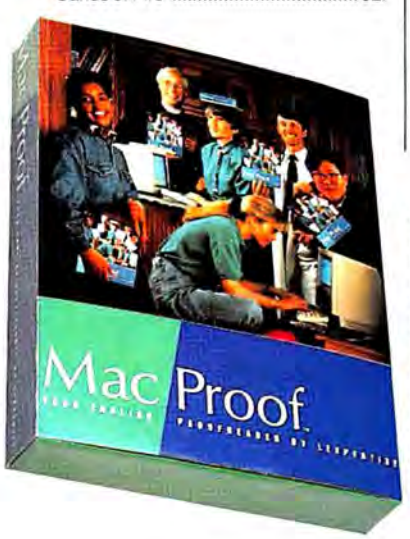
ACT/SAT Prep. ..... ea. 29
Visionary Software
Lifeguard ..... 49.
Voice & Video Instruction Videos
HyperCard or Pagemaker 3.0 ..... ea. 35.
Word 4.0 Video Tape ..... 35.

ENTERTAINMENT

Artworx
Bridge 6.0 ..... 22.
Broderbund
Shufflepuck Cafe ..... 23.
Where is Carmen Sandiego? ..... ea.29.
Bullseye
Ferrari Grand Prix or P51 ..... ea. 31.
Fokker Triplane ..... 23.
Centron Software, Inc.
BlackJack Ace or CrapsMaster ... ea. 27.
BlackJack Strategy Tester ..... 65.
CasinoMaster (5 pack) ..... 49.
CasinoMaster Deluxe Mac II version . 55.
Electronic Arts
Block Out ..... 26.
MicroLeague Sports
MicroLeague Baseball II ..... 38.
Softstream
22nd St. Whist Tutor or MacRummy .. 32.
Spectrum Holobyte
Faces ..... 25.
Tetris ..... 22.
Welltris ..... 20.
The Software Toolworks
ChessMaster or Life & Death ..... ea. 32.
Cribbage & Gin King ..... 39.
The Hunt for Red October ..... 20.
Three Sixty
Sands of Fire ..... 32.



MegaScreen Rival (MegaGraphics Display Systems)
MegaScreen Rival-Macworld Magazine's "First Choice" in black-and-white big screens. Combined with our excellent price, we rate this WYSIWYG two-page system your BEST BUY. 1024 x 826 resolution; flicker-free 75 Hz refresh. Interface cards and cables included. Compatible with Mac Plus, Mac SE, Mac SE/30, and all Mac II models. See line listing for additional MegaScreen systems. (hardware). **$1275.**

Toyogo's Nemesis
Go Master 4.4 ..... 47.
Joseki Genius ..... 29.
Nemisis Deluxe ..... 99.
Visionary Software
Synchonicity ..... 39.
XOR
Lunar Rescue or MacGolf 2.0 ..... 34.
MacGolf Classic ..... 52.
Road Racer ..... 39.
MacSki ..... 39.
NFL Challenge ..... 55.

FONTS

Adobe (Full line available)
Adobe Type Manager 2.0 ..... 55.
Adobe Type Reunion ..... 39.
Plus Pack ..... 109.
TypeAlign ..... 59.
Type Set 1 or 2 ..... ea. 58.
Typeset 3 ..... 129.
Altsys
Fontastic Plus 2.02 ..... 51.
Fontographer 3.01 ..... 249.
Metamorphosis ..... 149.
The Art Importer 2.0 ..... 89.
Dubl-Click
Menu Fonts 3.0 ..... 28.

MacProof 3.2.1 (Lexpertise)
You'll never get a second chance to make a first impression! MacProof 3.2.1 is your English proofreader. Without leaving your document, it proofreads all text written on your word processor: business, educational, personal and professional. MacProof is a desk accessory for the Macintosh Plus, SE, II, IIcx. Checks: mechanics, word usage, writing style and structure. You can customize the usage and the spelling dictionaries to your specific requirements. Compatible with MacWrite II V. 1.0, MacWrite V. 4.6 & 5.0, Microsoft Word 4.0, PageMaker 3.0/3.01/3.02, w/ 2mg memory, MindWrite V.1 and V.2. (spelling) **$115.**

Letraset
LetraStudio ..... 275.
LetraFonts (various) ..... ea. 69.
Tactic Software
ArtFonts ..... 50.

GRAPHICS & DESIGN

3G Graphics
Graphics & Symbols 1 ..... 50.
Business 1 or Accents & Brdrs 1 .. ea.65.
Adobe
Illustrator 3.0 w/ATM 2.0 ..... 349.
Illustrator 88 1.9.3 ..... 275.
Photoshop ..... 499.
Smart Art I, II, III, or IV ..... ea. 89.
Streamline ..... 225.
Aldus
Freehand 2.0 ..... 329.
Aperture Technology
Aperture Visual Information Mgr. ..... 599.
Bright Star Technology
HyperAnimator 1.5.1 ..... 98.
interFACE ..... 249.
Broderbund
TypeStyler 1.5 ..... 119.
Claris
MacDraw II ..... 289.

ACT/SAT Prep. (StudyWare)
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MacPaint 2.0 ..... 92.
Deneba
Canvas 2.1 ..... 189.
Ultra Paint ..... 125.
Digital Vision
Computer Eyes B&W ..... 199.
Computer Eyes Pro Color ..... 349.
Dream Maker
Cliptures, Vol. 1, 2, 3 ..... ea.69.
MacGallery ..... 27.
Electronic Arts
Studio/1 ..... 96.
Studio/8 ..... 295.
Studio/32 ..... 449.
Farallon™
MediaTracks™ ..... 189.
MediaTracks™ Multimedia pack ..... 319.
MediaTracks™ CD ROM ..... 319.

CoStar LabelWriter
The palm-sized labelWriter puts anything you can create with your Mac onto a 1" x 3-1/2" thermal label (130 per roll). Its exclusive print driver software lets you print directly from your database, word processor or any application. In vertical or horizontal format. **$185.**

Andrew Tobias' Managing Your Money
The most innovative personal finance package for the Mac. Its six main divisions remind you of important dates, manage income and checking, manipulate tax records, evaluate future plans, manage your investment portfolio and calculate net worth. Comes with lots of on-line help and comprehensive manuals. **$145.**

LYNX Turbo Trackball
The LYNX Turbo Trackball uses Honeywell aerospace technology to give precise fingertip control over cursor movement. Just spin the trackball and the cursor flies across the screen, quickly and accurately to where you want it. Great for desktop publishing, CAD/CAM, graphics and arcade games. **$59.**

Enhance (Micro Frontier)
Picture perfect. Enhance is an advanced image analysis and enhancement package for the Mac II family. It offers true 256 gray level support, an advanced histogram feature and is the first program to offer an assortment of masking buffers and real time on-screen filters. Enhance allows users to paint, filter and precisely adjust gray scales within isolated image parts. Use it to scrutinize and work with images of everything from micro organisms to entire geographic areas. (graphics). **$235.**

Smart Alarms Muliti-User Appointment Diaries 3.1 (Jam Software)
Who? What? Where? When? Keep track of all past and future appointments more accurately and thoroughly with updated Multi-User Appointment Diaries. The new version is more closely integrated with Smart Alarms 3.0 enabling you to set multiple reminders and times directly from the diary and more. Works on Tops, AppleShare or PSN. Includes new Diary Migration Utility to allow importing/exporting and appending/replacing text. Supports Z88 MacLite™ formats (desk accesories). Single User **$64.** Multi-User 1-4 **$125.** Multi-User 5-8 **$189.** Multi-User 9-15 **$249.** Multi-User 16-25 **$375.**

Quark XPress 3.0
New measurement and page palettes provide interactive on-screen access. A library stores frequently used items and a pasteboard provides a work area next to each page. Rotate text and graphics in 0.001 degree increments up to 360 degrees. Color trapping ensures precise color printing. **$529.**

SupraModem
SupraModem offers complete suppport of the Hayes "AT" command set, auto answer/originate, pass-through phone jack, programmable-volume speaker and stores frequently used numbers in non-volatile memory. Manufacturer provides one year warranty. **$119.**

Fontographer 3.1
Fontographer 3.1 reads and writes Type 1 PostScript fonts! Create & edit downloadable PostScript fonts containing standard alphanumeric and foreign characters, pictograms, icons, and logos to suit your purposes (headlines, advertising and logos). The auto-trace function to saves time when working with scanned characters and images. **$249.**

Innovative Data Design
Dreams 1.1 ..... 319.
Letraset
ColorStudio 645
MacroMind
MacroMind Director 2.0 ..... 439.
Media Maker ..... Call

Computerized Classic Accounting (Absolute Solutions)
The only accounting package that does accounting in the form and organization of manual books. Anyone who knows traditional manual accounting will feel at home with CCA. It allows for extremely fast data entry, prints checks, invoices, W-2's, etc., and generates reports. Since all CCA's documents may also be opened using Excel, you can customize, analyze and create forecasts and graphs using actual data that CCA summarized, formatted and organized during the accounting process. Requires Excel. (accounting). **$225.**

Metro ImageBase (Full Line Available)
Art Deco or People ..... ea. 85.
Newsletter Maker or Business ..... ea. 85.
Micro Frontier
Enhance 235
Multi Ad Services
Multi-Ad Creator ..... 865.
Paracomp
DrawTools ..... 62.
Film Maker ..... 449.
ModelShop 1.1 ..... 375.
Swivel 3D Professional 1.0 ..... 459.
Swivel ART ..... 87.
Silicon Beach
Digital Darkroom 2.0 ..... 248.
Super 3D 2.1 ..... 339.
SuperPaint 2.0 ..... 135.
SoftStream
Relational Objex ..... 149.
Somak
LaserArt CD-ROM #1 or #2 ..... ea. 59.
Sharpen Up ..... 59.
Strata
StrataVISION 3d ..... 375.
Strategic Mapping, Inc.
Atlas Map Maker 4.5 ..... 375.
Studiotronics
Colorset 1.5 ..... 229.
SuperMac
PixelPaint 2.0 ..... 225.
PixelPaint Professional ..... 389.

Tactic Software
Art Clips Vol. 1 or Vol. 2 ..... Call
T/Maker
Click Art Business Images ..... 32.
EPS Illustrations ..... 85.
Business Cartoons ..... 33.
Zedcor
DeskPaint 3.0 and DeskDraw ..... 115.

HARDWARE & PERIPHERALS

Aapps
DigiVideo B&W ..... 399.
DigiVideo Color ..... 699.
Co Star
Label Writer ..... 185.
Cutting Edge
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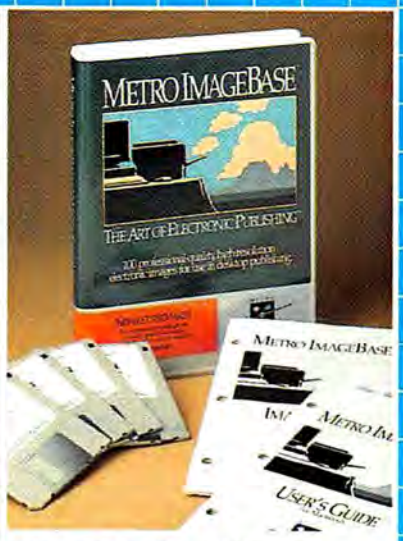
Hewlett Packard
HP DeskWriter ..... 859.
MegaGraphics Display Systems
Rival 2001 System for Mac II ..... 1275.
Rival 3001 System for Mac SE/30 . 1275.
Rival SE System for Mac SE ..... 1275.
Rival Plus System for Mac Plus ..... 1310.
19" Color 2008 Hi-Res/Mac II ..... 4460.
16" Color 2008 Hi-Res/Mac II ..... 3525.
Grayscale 2008/Mac II ..... 2210.
Grayscale 3008/Mac SE/30 ..... 2399.
Microtek
Microtek MSF-300GS Scanner ..... 1589.
Microtek MSF-300ZS Scanner ..... 1998.
NEC
Intersect CDR-35 ..... 419.
Qume
Crystal Print Publisher ..... 2900.
Seikosha America
Seikosha Printer (dot-matrix) ..... 235.
Sharp (full line available)
The Wizard - 32K ..... 229.
ThunderWare
LightningScan 400 ..... 385.
ThunderScan Plus ..... 199.

HYPERWARE

Bantam
Complete HyperCard Handbook ..... 22.
Beacon Technologies
HyperBible International Version ..... 175.
HyperBible King James Version ..... 145.
DataDesk International
HyperDialer ..... 32.
MicroMaps
HyperAtlas ..... 59.
Silicon Beach
SuperCard 1.5 ..... 189.
Softstream International
HyperHit 2.2 ..... 125.
Symmetry
HyperDA 1.2 ..... 45.

INPUT/OUTPUT

Basic Needs
Cordless Mouse ..... 99.
Caere
Typist ..... 499.
Calcomp
WIZ Tablet ..... 159.
WIZ Pen ..... 57.
WIZ Templates ..... 19.



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Liven up your documents with professional-quality electronic clip art from Metro ImageBase! Classy and up-to-date, they make your newsletters, presentations, reports and brochures communicate more effectively. Each of Metro's 14 packages is topic-related and contains 100 images-each drawn at 300 dpi for maximum resolution. Packages available include: ReportMaker, Business Graphics, Computer & Technology, NewsletterMaker and 10 more. (graphics). **$85.**

CH Products
Mach IV Plus Mouse/Joystick ..... 51.
Mirage Adaptor ..... 35.
Roller Mouse ADB ..... 75.
DataDesk Intl.
DataDesk Switchboard ..... 175.
Mac 101 Keyboards ..... 129.
Forte Communications
Remote Keyboard/Mouse ..... 289.
Kensington
New Turbo Mouse ..... 109.
Keytronic
MacPro Keyboard ..... 118.
Kraft
ADB Joystick Premium III (SE&II) ..... 49.

The Microsoft Office (Microsoft)
The Microsoft Office provides everything you'll need to increase productivity through word processing (Microsoft Word), spreadsheets (Microsoft Excel), desktop presentations (Microsoft Power Point), and electronic mail (Microsoft Mail). And it all comes in one compact package! Each program is a top-selling stand alone product. But why settle for only a piece of the pie? You'll want to use all of these productivity tools together for a complete business solution. (business) **$525.** Also available on CD-ROM **$669.**

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QuickStick ..... 39.
Trackball ..... 79.
Koala
MacVision 3.0 269
LYNX
LYNX Turbo Trackball ..... 59.
MicroSpeed
MacTrac ADB ..... **NEW** 75.
MacTrac DB9 ..... 62.
Micro Touch
The UnMouse ..... 189.
Mouse Systems
TrackBall ADB ..... 69.
Little Mouse ..... 75.
Pacific Data Products
MacPage ..... 425.
MacPage PE ..... 459.
Practical Solutions
Mouse Master ..... 39.
Summagraphics
Bit Pad Plus ..... 319.

LANGUAGES

Digitalk, Inc.
Smalltalk/V MAC ..... 125.
Shana Corporation
Inside Out ..... 369.
Symantec
THINK'S C 4.0 or Pascal ..... ea. 165.
Zedcor
ZBasic 5.0 ..... 99.

MEMORY UPGRADES/ ACCELERATORS

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For IIfx - 80ns ..... 119.
For LaserWriter II NTX - 80ns ..... 119.

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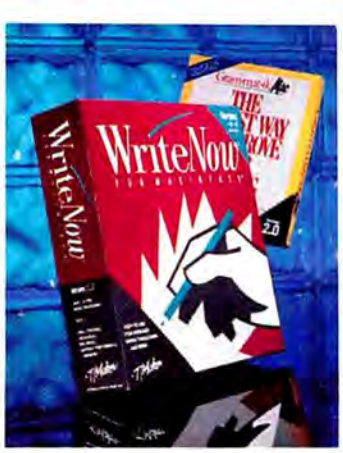
MaraThon 030 Accelerators ..... 529.
MacSnap 524E ..... 185.
MacSnap 524S ..... 239.
MacSnap 548S ..... 499.



MODEMS/FAX

Abaton
InterFax12/48 ..... 265.
InterFax 24/96 ..... 419.
Best Data Products
SmartOne 2400/1200 ..... 139.
Dove
DoveFax desktop ..... 299.
Hayes
Smartmodem 2400 ..... 349.
Smartmodem 9600 (V series) ..... 759.

SmartOne 2400 Modem (Best Data Products)
When you need a 2400 baud modem, the SmartOne 2400/1200 provides an economical alternative. For less than the cost of some 1200 bps units, you get a Hayes compatible modem with auto answer/originate, 300, 1200 and 2400 baud operation, pass-through phone jack, speaker with programmable volume, and a manufacturer's two-year warranty. All user options are stored in non-volatile memory. Includes free Quicklink II communications software, modem, cable and **CompuServe/Prodigy Start-Up Kit** offer. (modems) **$139.**

Power User
2400 baud modem ..... 99.
24/96 Mini Send Fax ..... 149.
Prometheus
MaxFax ..... 309.
2400 Mini Fax ..... 209.
ProModem 2400 SE Int. ..... 209.
ProModem 2400M ..... 199.
ProModem 2400M II ..... 205.
Travel Modem ..... 205.
Supra
Supra Modem 2400 ..... 119.

MUSIC AND SOUND

Altech
MIDI Interface ..... 59.
Coda
MacDrums ..... 31.
Perceive ..... 49.
Electronic Arts
Deluxe Music Construction 2.5 ..... 85.
Deluxe Recorder ..... 99.

WriteNow 2.2 (T/Maker)
WriteNow now comes with Grammatik 2.0, a top grammar/style checker($99.00 value-FREE). The two-time winner of the prestigious MacUser Eddy award, WriteNow features a 1.4 million word thesaurus, 135,000 word dictionary (the largest thesaurus/dictionary combination in the Macintosh world) and compatibility with Microsoft Word. In addition to being one of the most affordable, fastest and easiest Mac word processors available, WriteNow can still run on a floppy disk system. (word processing). **$119.**

Farallon Computing
MacRecorder 2.0 (records sound) ... 159.
MacRecorder Voice Digitizer ..... 99.
MacRecorder Voice Digitizer-10-pak Call
Passport Designs
NoteWriter II 2.3 ..... 325.
Passport MIDI Interface ..... 89.
Primera Software
Different Drummer ..... 59.
Repertoire
Music Publisher ..... 359.
Resonate
Listen 2.0 ..... 62.
Tactic Software
Sound Clips Vol. 1 ,2,3,or 4 ..... ea. 49.

SECURITY & VIRUS PROTECTION

ASD Software, Inc.
FileGuard 2.5 ..... 145.
FileGuard Office 5-pack ..... 435.
FileGuard Office 10-pack ..... 685.
Fifth Generation
Disk Lock ..... 118.
Microcom
Virex ..... 59.
Virex 10-pack ..... 349.
Kent Marsh
MacSafe II ..... 107.
NightWatch ..... 86.
QuickLock ..... 34.

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LifeTree
Correct Grammar ..... 49.
Microlytics
Word Finder 2.0 ..... 34.
Sensible Software
BookEnds or Sensible Grammar ..... 51.

STATISTICAL ANALYSIS

Abacus Concepts
StatView II ..... 279.
StatView SE+Graphics ..... 179.
SuperANOVA ..... 309.
Wolfram Research
Mathematica (SE) ..... 450.

UTILITIES

Abbott Systems
CanOpener 1.1 ..... 64.
Chesire 1.0 ..... 63.
Aladdin Systems Inc.
Programmer's Assistants ..... 57.
Shortcut ..... 46.
StuffIt Deluxe ..... 63.
ALSoft
DiskExpress II 2.04 ..... 57.
MultiDisk ..... 49.
Master Juggler ..... 64.
American Power Conversion
Power Chute ..... 69.
Berkeley System
After Dark ..... 24.

Mainstay
AntiToxin ..... 59.
Symantec Corporation
S. A. M. ..... 67.

SPELLING/DICTIONARY THESAURUS CHECKERS

Deneba Software
BigThesaurus ..... 64.
Spelling Coach Pro 3.1 ..... 124.
Electronic Arts
Thunder II ..... 49.
Lexpertise
MacProof 3.2.1 ..... 115.

QuicKeys 2™ (CE Software)
New, more intuitive QuicKeys 2 lets you customize applications to make them work the way you want, build new applications from old ones and automate repetitive tasks. Put your entire extended keyboard to work by assigning anything you select or click to its keys. Automate a long task with one of the two new "watch me" modes. Any QuicKey can be activated using timer options that will repeat the task every minute, hour, day or week. (utilities). **$64.**

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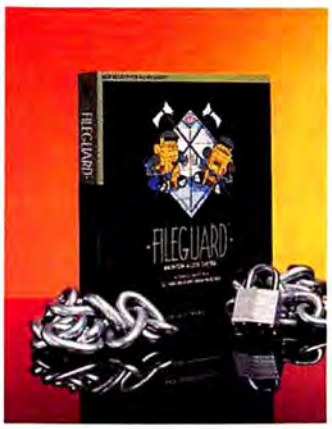
CE Software
Alarming Events ..... 85.
QuicKeys 2.0 ..... 64.
Caere
OmniPage 2.1 ..... 539.
Central Point Software
Copy II Mac ..... 23.
Mac Tools Deluxe ..... 75.
Custom Applications
Freedom of Press 3.0 ..... 255.
Dantz Development
Retrospect ..... 148.

Now Software
Now Utilities ..... 89.
Screen Locker ..... 45.
OLDUVAI
ClipShare ..... 165.
MultiClip 2.0 ..... 69.
ON Technology
On Location ..... 75.
QMS
UltraScript ..... 119.
UltraScript Plus ..... 299.
Software Innovations
HandOff II ..... 52.
SuperMac
DiskFit 1.5 ..... 58.
Symantec Corporation
Norton Utilities for the Mac ..... 84.
SUM II ..... 99.



FileGuard (ASD Software)
"FileGuard stands out, especially for corporate users." MacUser May, 1990 Issue Protect your Hard drives and Partitions from unauthorized access (including security bypass with a system diskette), copying, and erasure; Applications and Files/Folders (including system folder) from unauthorized access, deletion, and/or illegal copying; Desktop (including system folder) from alterations by unauthorized users; Keep an eye on System Usage with the system users log which continuously tracks user/group activity. (security) **$145.** Office 5 Pack **$435.** Office 10 Pack **$685.**

Tactic Software
FontShare 2.0 ..... 149.
Icon-It 2.0 ..... 45.

Dayna Communications
DOS Mounter ..... 55.
Fifth Generation
FastBack II ..... 118.
Suitcase II 1.2 ..... 49.
SuperLaserSpool 2.0 (single user) .... 87.
SuperSpool 5.0 ..... 58.
ICOM Simulations
On Cue ..... 35.
Insight Development
MacPrint ..... 95.
Magic Software
AutoSave II ..... 28.
BackMatic ..... 50.
Mainstay
Capture 3.0 ..... 49.
MacFlow 3.5 ..... 125.

WORD PROCESSORS & OUTLINERS

Claris
MacWrite II ..... 145.
Microsoft
Word 4.0 ..... 245.
RightSoft
RightWriter for the Mac ..... 55.
Tactic
Clairvoyant ..... 49.
T/Maker
WriteNow 2.2 ..... 119.
WordPerfect Corp.
WordPerfect ..... Call

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A PostScript virus may be on the loose, so take heed if you have a LaserWriter or imagesetter. This so-called Trojan horse is apparently a hidden line of code that's being downloaded in print jobs. It resets the printers' internal password, rendering the printers inoperative. The suspected source is an unidentified EPS file, such as a piece of public-domain clip art. A free prevention program is being offered by the Cheshire Group ([707] 887-7510) and Peter Fink Communications ([617] 527-1899).

By Aileen Abernathy

It's official: Ventura Publisher is coming to the Mac. Announced August 8, Ventura Publisher, Macintosh Edition, will cost $795 and should ship by year's end. Ventura Software (a Xerox company) has the top-selling page-layout program on the PC side, and it brings two strengths to the Mac market: cross-platform compatibility (there are three PC versions — DOS, Windows 3.0, and OS/2) and long-document processing. Its primary targets are people who produce long, structured documents (such as books and technical materials); database publishing; and work-group publishing. Networking capabilities are built in, allowing multiple users to access a document simultaneously over a network. Unfortunately, Ventura faces an uphill battle for user loyalty, because two products with significant long-document features — PageMaker 4.0 and FrameMaker — are already available.

Prepress is a fast-growing segment of the Mac publishing market, helped along by the increasing number of Mac-to-prepress links (see "Mac-to-Prepress Links" in this issue). As with any market in the growth phase, the names and players are changing quickly. Two of the Big 3 in prepress — Scitex, Crosfield, and Hell — are undergoing changes in ownership. Crosfield is now owned by DuPont Imaging Systems (the equipment still carries the Crosfield name), and Linotype is trying to acquire Hell Graphic Systems. ✷ Several other companies are jockeying for a piece of the prepress action. Kodak, for instance, recently introduced the Prophecy workstation, which lets you perform high-end color-image processing on the desktop for about half the price of traditional proprietary systems. In addition, look for one or two large Japanese companies to enter the high-end prepress market in the near future.

Product news: Altsys has added support for Type 1 fonts to its latest versions of Fontographer and Metamorphosis. In addition, Fontographer 3.1, a typeface-creation program, can now export its fonts as EPS files and offers improved automatic hinting. Metamorphosis 1.5 no longer requires a PostScript printer to generate editable outlines from PostScript fonts. ✷ Pantone has released the *Process Color Imaging Guide*, which shows 732 Pantone colors next to their closest CMYK simulations. The guide should make it easier to achieve accurate Pantone colors in four-color printing, because its CMYK values correlate with the percentages displayed in the Pantone dialog boxes of software such as PageMaker and QuarkXPress. (For a discussion of Pantone color on the Mac, see "The Pantone Touch," May '90, page 341.)

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Mac-to-Prepress Links

Using a prepress link, you can design a publication on the desktop and transmit it to a high-end prepress system for color processing and film separations.

By Keith Baumann and Aileen Abernathy

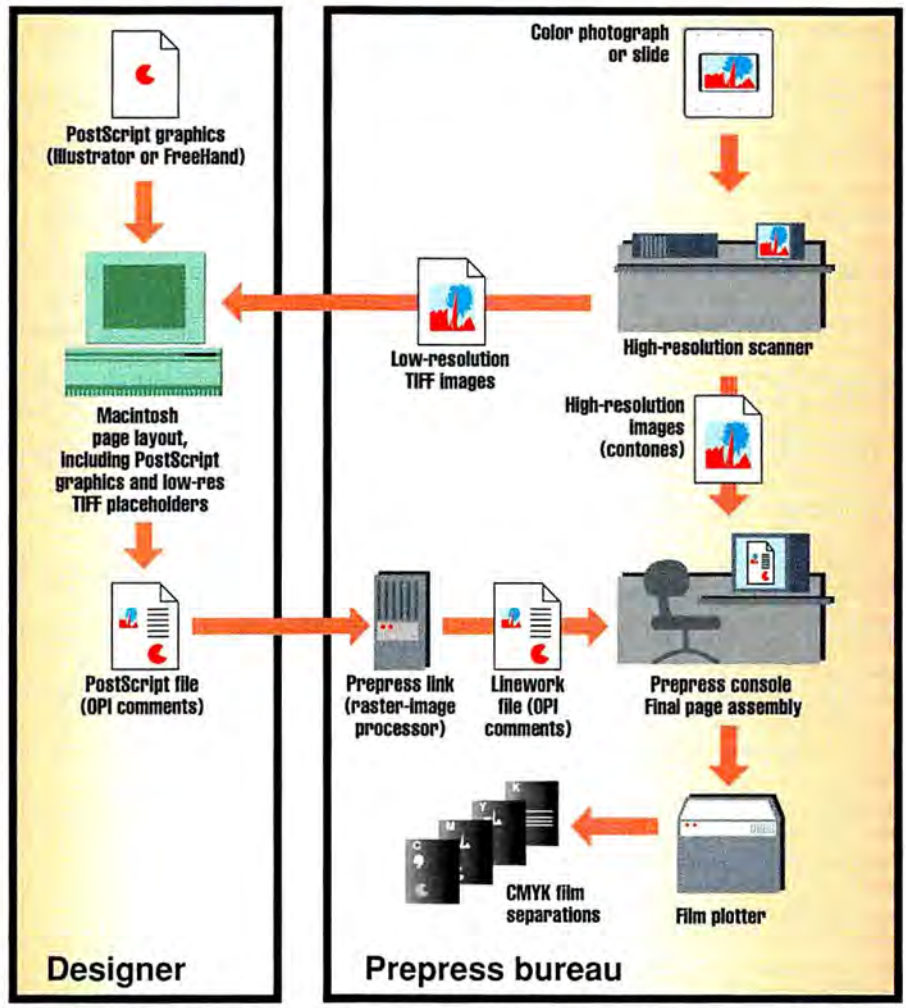

Figure 1: In the typical setup for a prepress link, color images are scanned on a high-resolution drum scanner at the prepress bureau and low-resolution versions are given to the designer for layout purposes. Completed page-layout files are returned to the prepress bureau, where final page assembly is performed and color separations are output on a film plotter.

We've all heard the hype, seen the demos, and scrutinized the eye-catching print samples. The companies all promise that "anyone can produce high-quality color separations with a Mac and our software!" True, Mac-based publishing *is* evolving at a rapid rate, and a new breed of sophisticated programs *does* let us perform tasks that were once possible only on half-million-dollar prepress systems. But producing a top-quality color publication directly on the desktop is still an iffy proposition.

For one thing, few desktop designers or service bureaus have the expertise of skilled prepress operators, who understand all the intricacies of four-color work, from color correction and line frequencies to trapping and separations. Prepress shops use carefully calibrated equipment, including color monitors, scanners, and film plotters, to ensure that the colors on-screen precisely match those in print. And because they are experts on all phases of the production process, prepress operators can correctly adjust color separations to match the type of paper, ink, and printing press being used.

Mac-based publishing also has technological barriers. Many experts feel that PostScript color hasn't attained the level of quality and reliability needed to compete with high-end prepress systems. Imagesetters still have problems with moiré patterns and misregistration, and most page-design programs can't correctly trap page elements. Calibrating colors between the screen and paper is still a problem, and desktop printers are not yet adequate proofing devices. Desktop scanners can't capture color photographs that match the quality of those produced by the drum scanners found at prepress houses. Even if they could, the files would be enormous and take forever to print on an imagesetter. (For more on color issues, see "Color: Techniques & Technologies," May '90, page 199.)

No wonder many people in the advertising and publishing industries (the major users of color prepress) continue to rely on the proven professionals at high-end prepress shops. But that doesn't mean the Mac is on the sidelines when it comes to color publishing. The recent introduction of design-to-prepress links gives you the best of both worlds. A prepress link is essentially a translator that converts your Mac's PostScript files into the non-PostScript environment of the prepress system. You can design a publication on the Mac — availing yourself of its graphics power, ease of use, and flexibility — and then transmit the file to a high-end electronic prepress system for color processing and film separations. The link setup is at the prepress shop, so you don't have to purchase any additional hardware or software (Scitex Visionary is an exception).

Prepress links are growing in popularity and are available from the traditional prepress vendors (Scitex, Crosfield, and Hell) as well as from lesser-known companies such as CyberChrome. When they are used wisely, these links can save you time and money — not a minor consideration, because prepress console rates run as high as $700 per hour. To give you a feel for how the process works, here's a brief look at a typical Macintosh-to-prepress operation, followed by an overview of the offerings of the vendors just mentioned.

How It Works

High-quality color is the name of the prepress game, so the work flow usually begins at the prepress shop (see Figure 1). The Mac-based designer gives the prepress operator color photographs or transparencies, which are scanned at high resolution on a drum scanner. Each scan is saved in two forms: The high-resolution image is stored in the prepress system for later use, and a low-resolution TIFF image is returned to the designer for use as a placeholder in page layout. The designer builds the publication, incorporating text, PostScript illustrations, and low-resolution scans, which are positioned, sized, and cropped as needed. The completed layout is saved to disk either in the program's native format or as a PostScript file, and the file is sent to the prepress shop.

At the service bureau, the prepress link — actually a RIP (raster-image processor) — translates the Mac PostScript file into the prepress system's proprietary format. The resulting prepress file, usually called *linework*, is essentially a big color bit map that contains all the type, graphic shapes, and rules. Because each page is now a bit map, text and other elements cannot easily be edited or rearranged. Prepress systems were created to handle high-quality color, not page design, so the designer normally must make changes to the type or other page elements on the Mac and then resend the file to the prepress system.

Linework files are generally processed at higher resolutions than are continuous-tone images (also called *contones*), which consist of scanned photographs and other bit-mapped images. TIFF and PICT2 graphics are usually treated as continuous-tone images; low-resolution copies of these images may be used as placeholders in the page layout, while the original, high-quality versions are given to the prepress operator as separate files and processed as contones. All the contones — scanned color photographs and image files brought over from the Mac — are manipulated and color-corrected on a special console, using a calibrated color monitor.

Once initial preparations have been completed, the linework and contone files are merged to form the final pages. Depending on the prepress system, this process is either done manually (by an operator working on an assembly console) or automatically (through the prepress software).

If the pages must be composed manually, the prepress operator assembles and traps all the page elements, inserting the high-resolution contones and duplicating the cropping, scaling, and positioning established by the designer. Ideally, the linework file should contain clear masks to indicate to the prepress operator where to drop in the contones to complete the page assembly. Otherwise, the operator must create the masks as well as manually place the scanned images. One way the designer can save some console time is to replace all of the TIFF images in the page layout with solid-color tint boxes; the prepress operator can then use these as

The Outer Limit

On prepress systems, a linework file has a limit of between 245 and 256 colors. This limit was never a problem until prepress operators began processing PostScript illustrations. The extensive use of gradients (or blends) in PostScript images means they often exceed 256 colors.

In the prepress world, color blends — referred to as *vignettes* — are handled as a specific type of color fill. The operator simply indicates the start and end colors, and the system automatically generates a completely smooth transition. In contrast, a PostScript drawing program, such as Adobe Illustrator, simulates blends by using a series of individual shapes, each filled with a distinct hue. Thus, a single PostScript blend can easily surpass 256 colors.

At present, prepress links have no way of recognizing PostScript blends and automatically replacing them with vignettes. Many prepress shops strip out the blends from a Mac PostScript file and then fill the areas with the proper vignettes. You may save money by consulting with the prepress bureau ahead of time and then preparing the file yourself. Another alternative is to color-separate the PostScript graphic into CMYK files with Adobe Separator or another separation utility and then send the individual files through the prepress link. Unfortunately, this technique increases processing time on the prepress end and adds to your bill.

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Prepress systems that use OPI (Open Prepress Interface) can assemble pages automatically. The high- and low-resolution versions of scanned images are linked, so when the final pages are composed, the prepress software automatically replaces the low-resolution TIFF images with image masks and then electronically strips in the high-resolution scans. OPI comments embedded in the page-layout file tell the prepress system which TIFF files to find, where to place them, and how to crop and size the images — all the chores the console operator would normally have to do. (OPI is a standard method for describing the placement, scaling, and cropping of scanned images. For more information, see "Prepress: The OPI Option," October '90, page 219.)

This automatic replacement process sounds great and theoretically should save you costly console time, but it works well only if you know the final image size and orientation when the high-resolution scans are done — that is, *before* you do the page layout. The prepress operator requires this information to set the correct resolution for the scan. If the scanned images must be resized at page-assembly time, not only does image quality suffer, but scaling and rotation (if needed) also take an enormous amount of processing time. It's usually much simpler (and cheaper) to perform low-resolution scans with a desktop scanner for page-layout purposes and give printouts with cropping instructions to the prepress operator, who will subsequently use them as guides in performing the high-resolution scans and page composition.

Once page assembly has been completed, the prepress operator generates a set of color proofs for the designer's approval. The final step is to output film separations through a film plotter, which produces the four CMYK plates required for printing.

Scitex Visionary 3.0

Scitex was the first major prepress vendor to offer a Macintosh link. Visionary provides access to sophisticated design and production features not available from other prepress systems, but it's also the only prepress link that requires a major expenditure by users. The designer must purchase — at minimum — the Visionary software, which consists of a modified version of QuarkXPress with Bitstream fonts and special coding for

When used wisely, prepress links can save you time and money — not a minor consideration, because prepress console rates often run as high as $700 per hour.

various Scitex features. The designer uses QuarkXPress to complete the page layouts and then transmits them via modem to a Gateway workstation at the Scitex bureau. Gateway is a Mac II-based RIP that converts the Visionary files to Scitex format for processing on the Scitex Response prepress system.

Unlike other prepress links, Visionary can generate complete page-geometry information. This means that each graphic element on a page — text, shapes, rules — is translated as a separate bit-mapped file, instead of forming one large composite graphic, which makes it easier for the prepress operator to reposition page elements if last-minute changes occur. Although the page-geometry capability is highly touted, it's often impractical. Page elements take longer to process on a prepress system, and because console time is so expensive, it's sometimes faster and more economical to make changes on the Mac and resend the file to the Scitex system.

All the scanned images in the designer's layout are low-resolution placeholders. These are replaced by high-resolution Scitex scans before the film separations are printed. This replacement process is electronically automated (as with OPI) if the low-resolution scans are produced at the Scitex bureau as opposed to being scanned on a desktop unit. (The scanning dilemma mentioned above still applies, however.) Visionary cannot accept EPS, TIFF, or PICT2 images through the prepress link. These graphics must be given to the Scitex operator as separate files; they are interpreted by Scitex Tools software, which converts them into CT (continuous-tone) format. The operator then manually positions the images on the page.

The Mac community has been highly critical of the Visionary system because of its expense and proprietary nature. It locks you completely into Visionary's version of QuarkXPress, with no other options for page-layout software. In addition, your typefaces are restricted to a specific selection of Bitstream fonts, so forget about that Adobe Galliard you like so much.

Only an official Scitex service bureau can sell and install Visionary, and it comes with hardware copy protection, so each single user must buy a copy. There are several Visionary configurations — software only, and software plus a Mac and/or other hardware — so the price varies. However, the software alone can cost several thousand dollars — or nothing at all! — depending on what the Scitex bureau decides to charge. Remember, we're talking here about a modified version of QuarkXPress, which retails for $795.

Visionary isn't compatible with the standard version of QuarkXPress, so you can't save money that way. There is a cheaper version, Visionary Junior, that's designed for text-intensive use, which could lower the overall cost in a multiuser environment. On the hardware side, Visionary requires a Mac IIcx (or later) with a 19-inch color monitor, 80-megabyte hard-disk drive, and 8 megabytes of RAM. The Scitex bureau will be glad to sell you the entire platform or the necessary upgrades. Scitex also markets an optional modem, desktop scanner, and thermal wax color printer.

Scitex VIP 1.5

VIP (Visionary Interpreter for PostScript) was created to add PostScript capabilities to Visionary, but Scitex now offers it to its service bureaus as a separate item. This fully functional prepress link can handle both EPS images and Type 1 fonts (now you can use Adobe Galliard!), and its flexibility has encouraged some Scitex bureaus to use it instead of Visionary. VIP is a boon to designers: They pay nothing to use it, *and* they can work with the page-layout program of their choice.

With VIP, page layouts are saved in PostScript format and passed through the Gateway interpreter at the Scitex bureau for processing and output of four-color film. Like Visionary, VIP 1.5 can't directly handle PICT2 images or color TIFF scans. The operator must process these graphics separately, using Scitex Tools to convert them into CT format and then manually positioning them on the page. Unlike Visionary, VIP isn't able to

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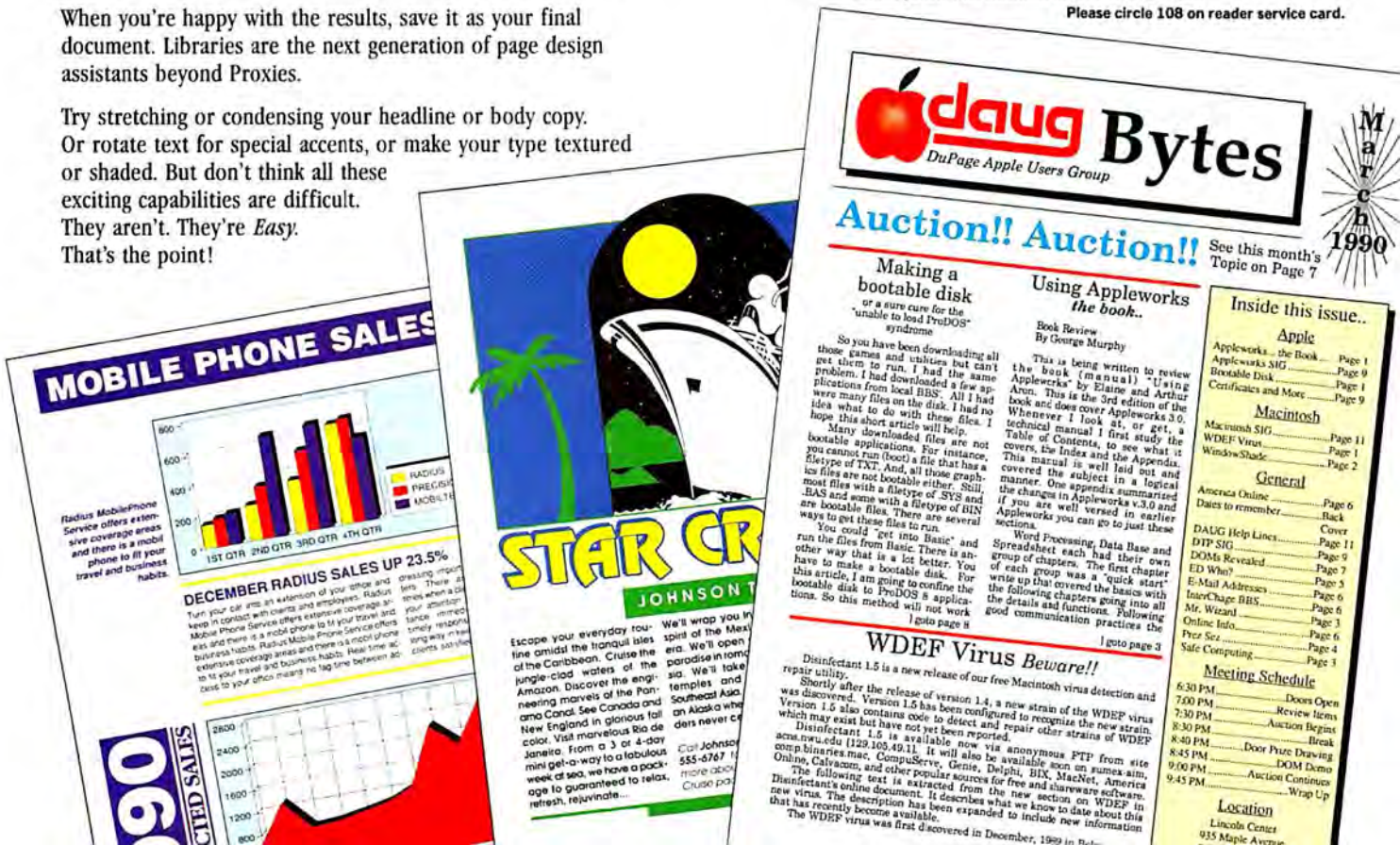

generate page-geometry data and it doesn't replace low-resolution TIFF scans automatically with their high-resolution counterparts, but these aren't considered major drawbacks. VIP also has an upper limit of 256 colors on a page, which causes a problem with PostScript blends (see the "Outer Limit" sidebar).

Version 2.0 of VIP, which is expected to ship by the end of 1990, will add TIFF and PICT2 compatibility. The Scitex Gateway site will then be able to send Macintosh page files, complete with PostScript *and* bit-mapped images, directly to film output without requiring any operator intervention.

Crosfield StudioLink 2.1

Crosfield originally developed its prepress link solely to interpret Ready, Set,Go! files, but StudioLink's capabilities have since been expanded to include a variety of input formats. Version 2.1 adds Type 1 fonts; OPI compatibility; and support for DesignStudio, PageMaker, and QuarkXPress. (StudioLink is now marketed by DuPont Imaging Systems, which acquired Crosfield in early 1990.)

StudioLink consists of a Mac II plus a Sun SPARC-based workstation, which uses a Hyphen RIP to interpret the files. The designer creates the page layout, using an off-the-shelf layout program, and then sends the file to the StudioLink setup at the prepress shop. The file goes first to the Mac, where it's saved in PostScript format, and is afterward transferred via Ethernet to the Sun, which converts the file to linework format for processing on Crosfield's Studio prepress system.

StudioLink handles PostScript graphics just fine, but it can't process color TIFF or PICT2 files. If a page contains one of these image types, StudioLink automatically replaces it with a clear window, and the console operator manually drops in a high-resolution Crosfield scan. Because StudioLink supports OPI, the replacement of TIFF scans can be handled automatically, provided the low-resolution placeholders were generated from the high-resolution scan file.

Although StudioLink 2.1 works with many Mac page-layout programs, you can reap added benefits if you use DesignStudio, which is the only application that can generate complete Crosfield page-geometry information. The benefits (easier page adjustments) and drawbacks (longer processing times) are similar to those mentioned for the Scitex Visionary system.

Hell ScriptMaster 2.0

Hell prepress systems are respected for their immaculate, high-quality color output, and now Mac users can take advantage of this power with ScriptMaster, Hell's PostScript-compatible prepress link. Similar to the StudioLink setup, ScriptMaster runs on a high-powered

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Apollo 3500 workstation, which uses a Hyphen RIP to convert the Mac's PostScript files into Hell's proprietary linework format. The files are then processed on a Hell ChromaCom prepress system.

ScriptMaster 2.0 accepts files from several Mac applications, including PageMaker, QuarkXPress, Ready,Set, Go!, DesignStudio, Illustrator, and FreeHand. It supports PostScript graphics and Type 1 fonts, but it can't directly interpret color TIFF and PICT2 images. The next version, which was in development at press time, will accept 24-bit PICT images if they are processed as separate continuous-tone images.

Although Hell was the first prepress vendor to announce support for OPI, the current version of ScriptMaster doesn't support this feature. The new version will include OPI compatibility, however, allowing color TIFF scans to be electronically stripped into the prepress pages. (At press time, Linotype was trying to acquire Hell Graphic Systems from Dr.-Ing. Rudolf Hell, its parent company. It's too early to predict how the acquisition would affect Hell's prepress offerings.)

CyberChrome Imaging Centers

An interesting alternative to the high-end prepress link, CyberChrome Imaging Centers provide a controlled, quality production system in an all-PostScript environment. The basic setup consists of a PC running CyberChrome's prepress software, a color monitor, a high-resolution scanner, a color printer (for proofing), and an imagesetter (for film output). Mac PostScript files don't have to be translated into a proprietary format, so the production process is straightforward and has few limitations.

Designers can use their favorite fonts and image formats without worrying about compatibility issues or stripping costs. In addition, they retain complete control over a document all the way to film separation, reducing the cost of last-minute changes. And because the equipment is less expensive than high-end systems, the hourly rates are usually lower.

The CyberChrome system accepts files created in QuarkXPress, PageMaker, FreeHand, or Illustrator. Color images are input with CyberChrome's high-resolution desktop scanner and color-corrected on a 386-based PC equipped with a Targa video-display board. A low-resolution PICT2 file is then created, which the designer uses as a placeholder in the page layout. In contrast to high-end prepress systems, CyberChrome lets the designer scale and rotate continuous-tone images on the Macintosh without the requirement for rescanning.

The CyberChrome production process is similar to that of a prepress link that is equipped with OPI: Pages are assembled electronically, with placeholder images being automatically replaced by high-

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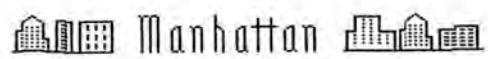

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resolution scans. (CyberChrome does not, however, use the OPI standard.) The completed pages are color-separated and then output to film on a Linotronic 300 imagesetter.

At present, there are 7 CyberChrome Imaging Centers scattered across the country (11 worldwide). If you want an in-house system, CyberChrome will sell you a complete package, including training, for $165,000 or so.

The CyberChrome solution possesses numerous benefits, but it does lack some production features of the high-end prepress systems. In addition, many experts feel that desktop scanners and PostScript imagesetters can't maintain the consistent high quality required for color prepress work.

But be forewarned: Desktop technology is advancing rapidly, and Macintosh-based color publishing may eventually match the traditional prepress systems in quality and surpass them in efficiency and price.

Keith Baumann runs BytesEyes Communications, a consulting firm specializing in the configuration and integration of electronic design and prepress systems. Senior editor Aileen Abernathy is *MacUser*'s resident DTP expert.

Directory

For more information on the prepress links mentioned in this article or to locate the prepress shop nearest you, contact one of the following companies:

CyberChrome, Inc.
25 Business Park
Branford, CT 06405
(203) 483-8815
CyberChrome Imaging Centers

DuPont Imaging Systems
65 Harristown Road
Glen Rock, NJ 07452
(201) 447-5800
Crosfield StudioLink

Hell Graphic Systems
145 Pinelawn Road
P.O. Box 9042
Melville, NY 11747-9042
(516) 753-4700
ScriptMaster

Scitex America Corp.
Eight Oak Park Drive
Bedford, MA 01730
(617) 275-5150
Visionary
V.I.P.

For a list of Scitex service bureaus in your area (which also market Visionary), contact:
Scitex Graphic Arts Users Association
(800) 858-0489

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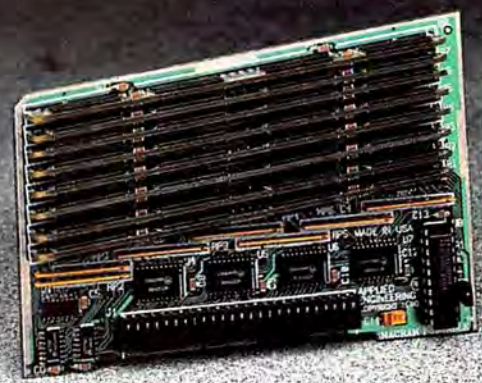

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Putting Spin on a Logo

Creating an animation can be relatively simple if you use the tweening function of a 3-D graphics program.

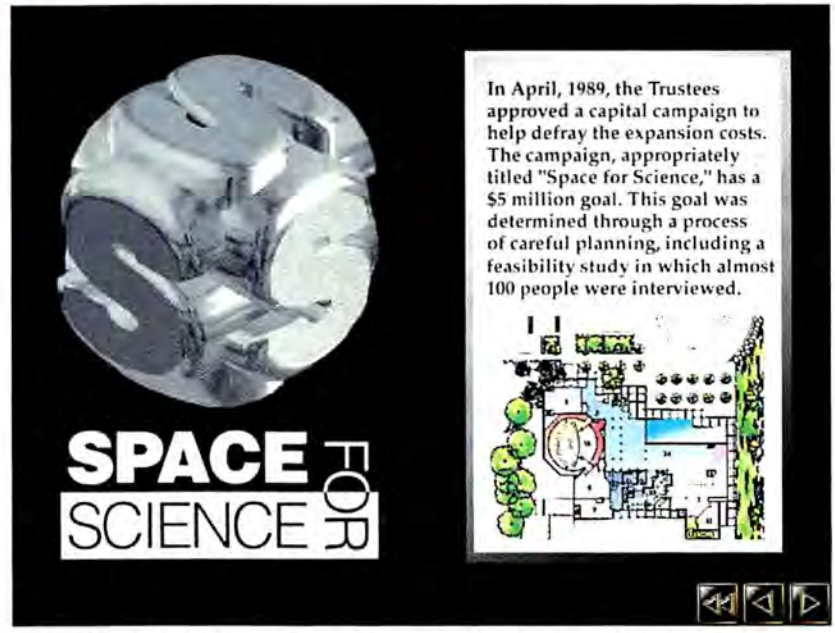
By the editors of *Verbum* magazine

To create an animation, most people use a 3-D rendering program. (Animation tools such as MacroMind Director can't *create* three-dimensional animations, although they can import them and play them back with great versatility.) In traditional cel animation, creating the many frames needed to produce a smooth-looking animation is a tedious process. But some 3-D rendering programs, such as Swivel 3D Professional, provide a powerful shortcut. If you specify the beginning point and endpoint of a motion or rotation, the program will supply the in-between frames. This automatic animation process is called *tweening*.

We used the sophisticated animation and rendering capabilities of Swivel 3D Professional to animate a 3-D logo. Although we could have used Dimensions Presenter, DynaPerspective, or Super 3D for this project, we chose Swivel 3D Professional because it provides object-shading features that eliminate the faceted look of the original logo.

Verbum: The Journal of Personal Computer Aesthetics **can be reached at P.O. Box 15439, San Diego, CA 92115; (619) 233-9977.**

1. The Finished Presentation

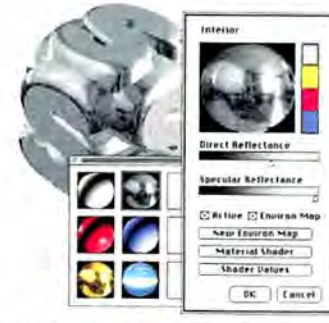


The presentation contains two animation sequences that show the 3-D logo forming and then spinning. The individual frames, or steps, are created with Swivel 3D Professional's tweening function and exported to MacroMind Director, where they are linked to form the finished animation. To complete the presentation, the spinning logo is combined with other elements, including a title block, interactive text, and buttons.

2. Creating the Logo

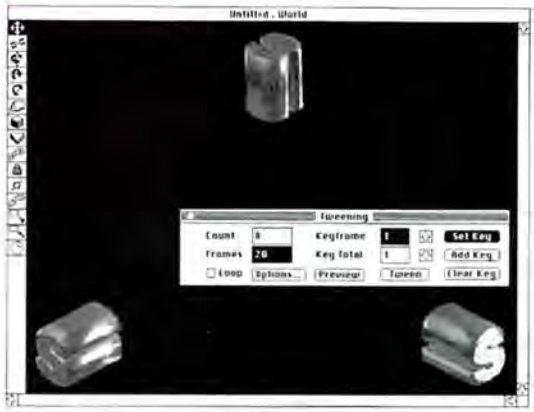
The original 3-D logo (not shown) was created in Swivel 3D Professional and had a flat shading. The first step in preparing the logo for animation is to apply smooth shading by choosing Smooth from the Render menu. The tonal differences are then averaged across all the facets, producing the rounded look shown here.

3. Refining the Surface Texture



The logo is given a shiny chrome surface by editing the parameters of color, material, reflectance, and environment. Several sets of surface qualities are created and applied to the logo until the right effect is achieved.

4. Beginning the Animation

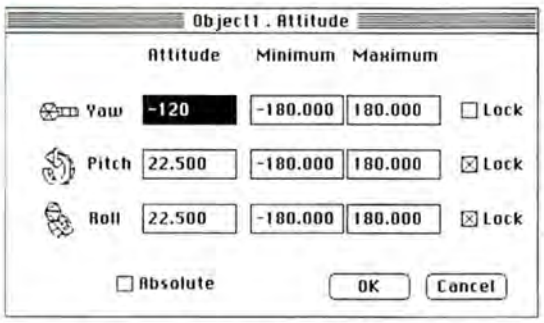


Once the shading and reflectance are right, the logo's components — the three *S* shapes — are separated and reduced in size. This is the first frame of an animation sequence that will show the *S*s enlarging and coming together to form the finished logo. The Set Key button in the Tweening dialog box is used to define the exploded view as Keyframe 1, the beginning point of the animation. The number 20 in the Frames field tells the program to create 20 "in-between" steps between Keyframes 1 and 2.

5. Tweening between Key Frames

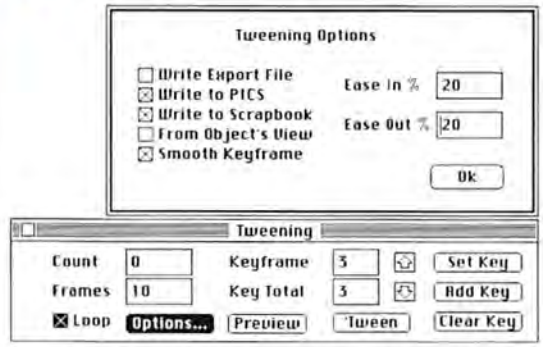
The three *S* shapes are merged to form the original 3-D logo (the numerical values for position and scale of each element were recorded). The re-created logo is defined as Keyframe 2. Clicking on Preview provides a rudimentary wire-frame view of the 20-step animation. Clicking on 'Tween produces the finished animation steps.

6. Spinning the Logo

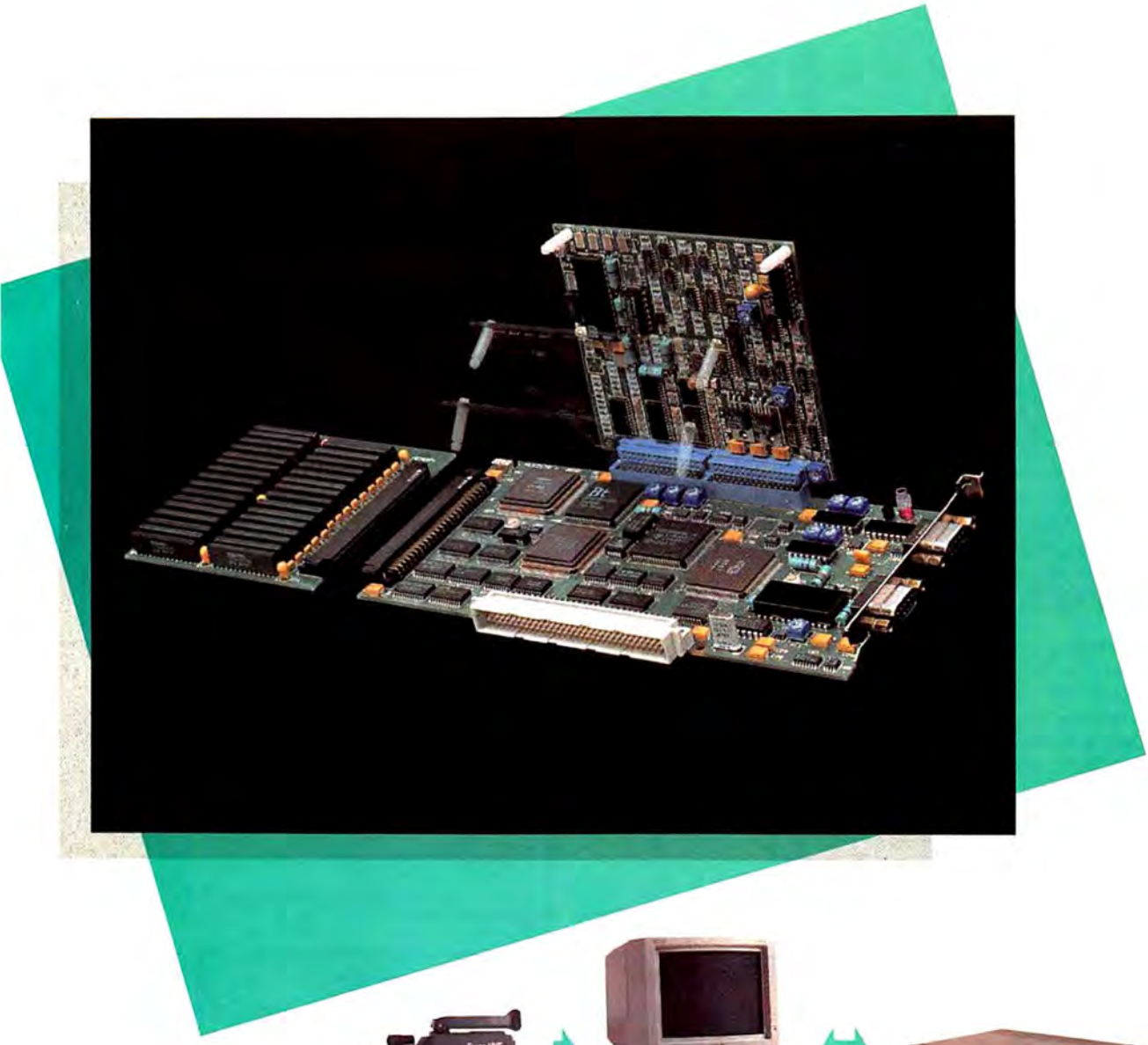


A second animation sequence is created to show the logo spinning around its *y* (vertical) axis. This time the finished logo is defined as Keyframe 1. The Yaw is set at -120 degrees in the Object Attitude dialog box, and the newly rotated logo is defined as Keyframe 2. The logo is rotated another 120 degrees to create Keyframe 3, and then Loop is selected in the Tween dialog box. This connects the last Keyframe to the first one, completing the 360-degree-rotation effect. The logo's other two rotational axes — pitch (horizontal, or *x* axis) and roll (depth, or *z* axis) — are locked at 22.5 degrees. Ten tweens are created between each pair of Keyframes.

7. Exporting the Tweens



Through the Tweening Options dialog box, the completed animation sequences are saved in both PICS and Scrapbook formats. The PICS file saves the entire document (including the static background), which can be viewed as a finished animation in full motion with MacroMind Accelerator. A Scrapbook file saves only the individual frames (and is therefore a smaller file) and is used to import both animation sequences into MacroMind Director, where they are linked and then combined with other elements to form the final presentation.



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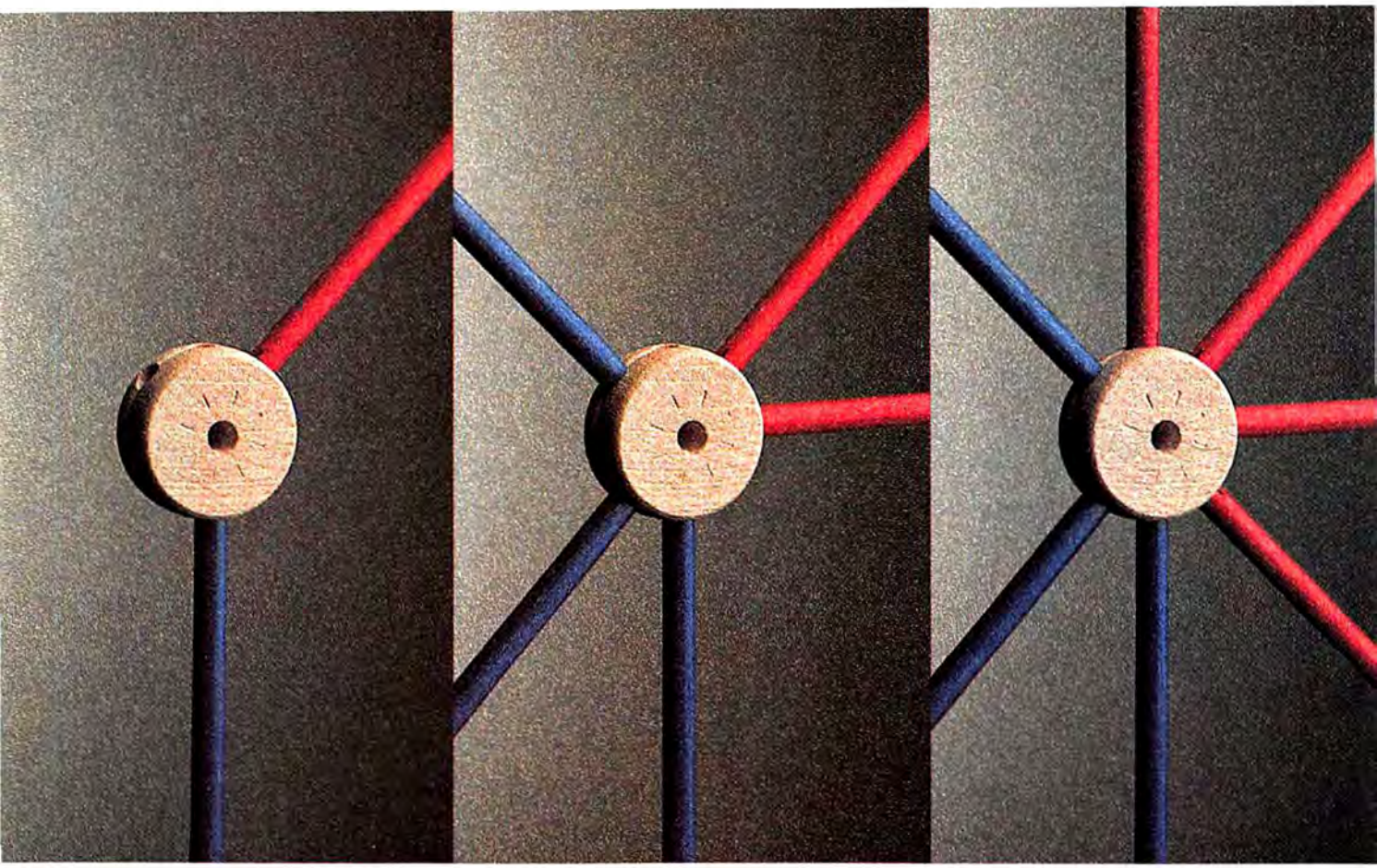

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GO Corp., rumored to be developing a pen-based computer, still hasn't let the cat out of the bag, but it recently released a small kitten. It admitted finally that it is, indeed, developing a product. Pay attention: That's news. It also revealed a licensing agreement with — are you ready? — IBM. Big Blue will market a pen-based computer using GO system software. Everything's still hush-hush on dates, prices, and look and feel.

By Henry Bortman

Card report. Ethernet cards, that is. Nobody's broken the $395 barrier yet, but several cards are just under four bills. Technology Works' EtherWorks II NuBus card (thick/thin or thick/10BASE-T) lists for $399; the EtherWorks SCSI costs $499. Nuvotech's NuvoLink II sells for $395; the NuvoLink SC (SCSI) lists for $495. ◆Meanwhile, in the Novell Macintosh-hardware fire sale, Dayna and Farallon have licensed Novell's Ethernet-card technology. Dayna will sell three DaynaPORT cards — the E/II for NuBus, the E/SE for the SE, and the E/30 for the SE/30 — for $499 each. Farallon is retooling Novell's twisted-pair Ethernet card for 10BASE-T compatibility. Pricey at $649, each card comes bundled with Timbuktu 3.1. ◆Farallon has bought Infosphere's Liaison software router. The newly announced version 3.0 will support Phase 2 AppleTalk and up to five networks.

Yet another AppleShare clone. Several, in fact. Sony is marketing an AFP-compliant Worknetting Server. Hardware: Sony's NEWS server; software: UNIX and Information Presentation Technologies' uShare server. Prices start at around $9,000. This one looks hot. ◆Mt. Xinu has released K-AShare, which turns a Sun workstation into an AppleShare server. Pricing starts at $995 for 15 users (sorry, Sun workstation not included). ◆HP has teamed up with Pacer Software to produce a version of PacerShare that runs on HP/Apollo's UNIX-based workstations and minicomputers. Pricing starts at $1,200 per server. ◆Finally, 3Com's 3+Open 1.1 LAN Manager now supports AFP-compliant 3+Open for Macintosh. The Mac add-on software is $1,195 and allows Mac users to use the AppleShare icon in the Chooser to access 3Com servers. The new 3+Open also interoperates with NetWare.

Not just another mail gateway. While Apple and DEC have been putting the finishing touches on LanWORKS for Macintosh, Alisa has been busy readying AlisaMail, a store-and-forward messaging system that implements and integrates dissimilar mail systems on a VAX. It consists of an "information switch," a SQL database that stores messages from different mail systems in a common format and then reformats them for forwarding to the recipient. The initial offering implements VMSmail and Microsoft Mail, and others are planned to follow. At between $8,000 and $17,500, it's not cheap.

DOS on the desktop. Insignia's SoftPC, which enables a Mac to run DOS applications, now has a junior cousin. AccessPC lets a Mac user mount a DOS disk directly onto the Mac desktop. At $129.95, it is the first challenge to Dayna's DOS Mounter, which performs a similar function.

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The Right Tool

Without good management tools, it's hard to analyze your network's behavior.

By Kurt VanderSluis

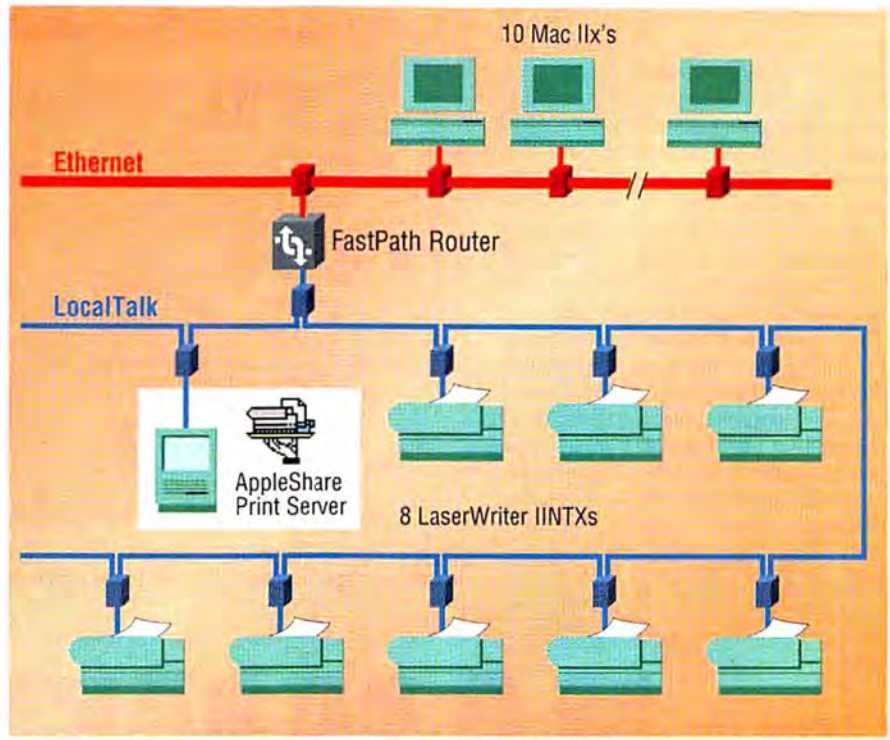

Figure 1: This user's internet configuration is inefficient when all eight LaserWriters are on a single LocalTalk network.

To analyze the performance of a network properly, you need precise tools. There are some expensive PC-based solutions, such as Network General's Sniffer, but to date, comprehensive Mac-based software solutions have been unavailable.

A while ago, I was asked to help with a network design for ten Mac IIx workstations on Ethernet. A FastPath router was connected to a LocalTalk segment that contained eight LaserWriter IINTXs, five of which were being spooled from an AppleShare Print Server (ASPS) on an SE/30 with 4 megabytes, which was also located in the LocalTalk segment (see Figure 1). The users prepared the company's government proposals. They tended to print all the proposals in the last few days before the government representatives arrived to receive the company pitch. The documents averaged 200 pages, and a pitch involved 8 to 12 proposals. To make matters worse, the users wanted to print 25 originals rather than print 1 original and photocopy it 24 times, because they wanted each person to have a fresh, crisp copy.

The network manager noticed that it took 40 percent longer to print the 25 original documents when all eight LaserWriters were printing simultaneously than it did when only one was printing. I suspected that all this printing was generating more traffic on the LocalTalk network than it could handle and that the printers were spending a lot of time sitting idle because the data couldn't get through from the Macs. I advised dividing the LocalTalk network into two separate networks, each containing only four LaserWriters, and having the SE/30 run Liaison (a software router) as well as the Print Server (see Figure 2). The FastPath can connect only one LocalTalk network to an Ethernet network; a Mac used as a software router can connect two LocalTalk networks to Ethernet.

This approach fixed the problem, and you might think that's the end of the story. The problem is, I'm not sure *why* my solution worked. Maybe having the spooler on LocalTalk was doubling the print traffic (one transmission to send it from a Mac to the

spooler and another to send it from the spooler to the printer). Maybe the FastPath couldn't keep up with the traffic level.

Why don't I know which reason it is? Because of the lack of good Macintosh-based network tools for AppleTalk networks. Some vendors have recently announced network-management software that may fill this gap (see "Networks: Under New Management," August 1990, page 226), but at press time, none that would have helped me with this example were available.

So meanwhile I began building some tools of my own, such as a HyperCard stack I call Packet Cruncher. It calculates two characteristics of network behavior. The first is network utilization, a measure of exactly how much of a network's bandwidth is being used during a specified time period. The second is statistical information about the size of the data packets on the network. In a future issue, I'll write about how Packet Cruncher works and about how you can obtain a copy from Zmac, *MacUser*'s on-line service.

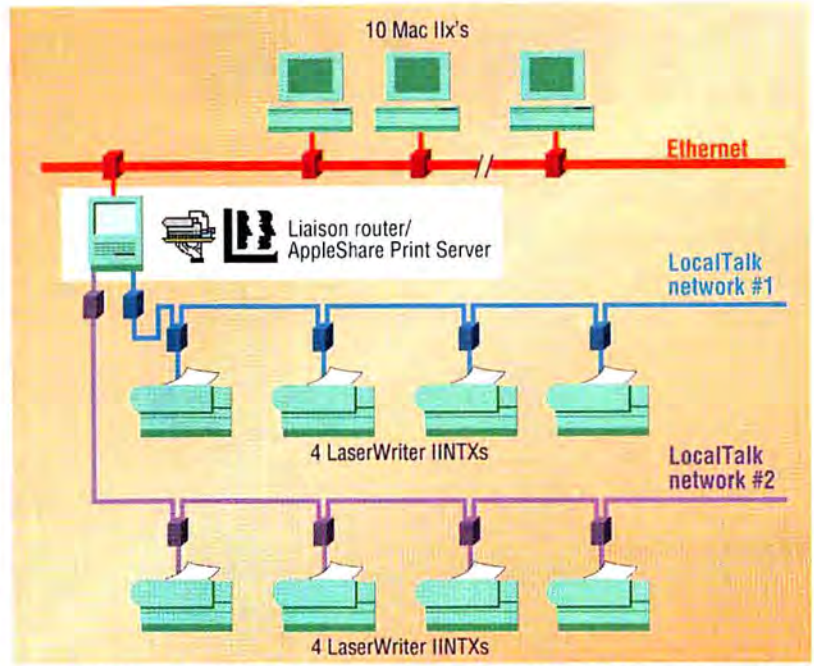

Figure 2: This configuration is more efficient than the one in Figure 1, but without proper network-management tools, it's hard to say precisely why.

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14 Excel Solutions

About eight out of ten Mac spreadsheet users rely on Microsoft Excel. But even though this program is popular, it isn't always easy to master. Here are 14 solutions to commonly asked questions about Excel.

By Shelley Zulman

Does this sound familiar? Every time you add new cells to your Excel spreadsheet, a dialog box appears. Why should you have to tell Excel over and over that you want to shift cells to the right?

The answer is, you don't.

Although the manual can give you an idea of available options, you won't find everything you ever wanted to know about squeezing maximum performance from Excel in its pages.

The following 14 answers to frequently posed questions provide tips and shortcuts that Microsoft's product-support team considers the most useful for Excel users.

1. How can I link Excel data and charts into my Word 4.0 document so that the Word document can be automatically updated when I change my data or charts in Excel?

Using MultiFinder

- Select and copy the Excel information that you want in your Word document.
- Quit Excel, and then open your Word document.
- Position the cursor where you want to paste the information, and choose Paste Link from the Edit menu.
- To update this information in Word after you've changed it in Excel, select the data in Word along with the identifier paragraph preceding the data. You can update everything you earlier copied from Excel or select specific rows or columns.
- Choose Update Link from the Edit menu.

Word starts up Excel (if necessary), opens your spreadsheet, copies the updated information, and then transfers it to your Word document (see Figure 1). If Word can't find the Excel program or file it's supposed to be linked to, it displays a dialog box and asks you to locate the program.

2. When I try to open many files, I get the error message "Can't open or save more documents." What limit am I running into?

When the Mac boots, the System sets the maximum number of saved files a document may have open at once. The number is generally 32, although it varies slightly from System to System and may change depending on whether or not you're using MultiFinder. The error message means that the System won't let Excel open any more saved files or save any previously unsaved files. You can still create additional new documents in Excel, but you can't save them until you close some of the currently open saved files.

3. When using Excel's database, I select a range of cells containing field names and

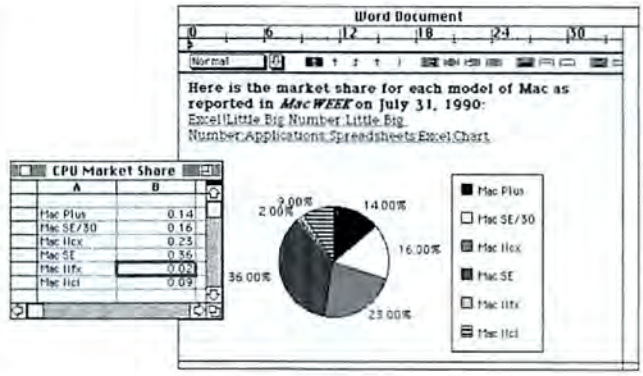

Figure 1: Interapplication links will be a major part of System 7.0 someday, but you can create them today by using Microsoft Excel and Word. The underlined text (which is formatted as Hidden) in the Word document identifies an updatable link to an Excel chart and spreadsheet.

choose Extract from the Data menu. I get the error message "Extract Range is not valid." What's wrong with my selection?

The names selected as the extract fields must exactly match the field names in the database. The names are case-sensitive and can't have any leading or trailing spaces, and the extract range can't have any blank cells in it. The best way to make sure the titles in your extract range match exactly the titles from your database is to copy the titles from your database directly to your extract range. Finally, any number or date field names in the database can't be used in the extract range. If you're still encountering problems after making sure the names match, try extracting each field independently to see which one is causing the alert.

4. How do I load a work space by default when I open Excel?

Save your worksheet, chart, macro sheet, or work space into a file, label it Excel Startup, and place it in your System Folder. Excel then automatically opens that file whenever the application is started.

5. How can I insert cells without bringing up a dialog box that asks whether I want to shift cells up or to the right?

Hold down the Option key, and select the range you want to insert. Excel will insert the range according to the default setting in the dialog box.

6. How can I line up the numbers exactly when I use both the regular-number format and the dollar format in the same column?

You can align the regular-number and dollar formats by selecting the cells with the regular-number format and choosing Number on the Format menu. Then select the dollar format, and delete the dollar signs in the Format Number dialog box.

7. How can I use the SUM function to add up individual times of less than 24 hours when the sum of the times exceeds Excel's clock limit of 24 hours?

This is a frequently encountered problem for many Excel users, and the solution is a simple formula.

Say you want to add three triathlon times, 14:10:00, 16:15:00, and 13:23:00 and get an answer in hours and minutes. (14:10:00 is 14 hours, 10 minutes, and 0 seconds.) Type the times into cells A1:A3.

Enter the following formula in cell A4 in General format to sum the times in hh.mm.ss format:

```
=INT(SUM(HOUR(A1:A3))
  +SUM(MINUTE(A1:A3))60)
  +(MOD(SUM(HOUR(A1:A3))
  =SUM(MINUTE(A1:A3))/
  60,1)*.6)+MOD(SUM(MINUTE
  (A1:A3)),60)/100
```

(In this case, the range is A1:A3 — the cells in which you entered the times — but you could substitute a different range for your own spreadsheet.)

To enter the formula as an array, press Command-Enter after typing in the formula. The formula should give you a total of 43:48 (43 hours, 48 minutes).

8. How do I create an *x*-*y* chart?

You can plot an *x*-*y* chart for one or more series of *y* data by using the Scatter format from the Gallery menu. If your data is in columns, enter the *y* data into the columns directly to the right of the *x* data on your worksheet. If your data is in rows, enter the *y* data into the rows directly below the *x* data on your worksheet.

To create an *x*-*y* chart:

- Select the data you want to plot, including column headings if you want to plot them as well. Copy the data to the Clipboard.
- Open a new chart. Choose New from the File menu, and select Chart. Click on OK, and a blank chart will appear on your screen.
- Choose Paste Special from the Edit menu. If your data is in columns (or rows), choose Values in Columns (or Rows) and Categories in First Column (or Row). If you have also copied column (or row) headings for inclusion in the chart, click on Series Names in First Column (or Row).
- Click on OK, and the data will be plotted in a bar chart.
- Select Scatter from the Gallery menu, and the data will be plotted as an *x*-*y* chart.

9. How can I plot information according to a best-fit line rather than through the actual data points?

You'll probably want a best-fit line if you're plotting experimental data and the trend is more important than the actual data. To create such a chart, you must first create another series on the worksheet, using the TREND function, and plot it along with your actual data. You can then hide the line drawn through your actual data points and hide the markers shown with your trend line by choosing Patterns from the Format menu.

Suppose you're measuring the height

Table

	A	B
1	Bouncing Ball	
2	Height Dropped (in cm)	Height Bounced (in cm)
3	10	5
4	20	9
5	30	13
6	40	22
7	50	25
8	60	28
9	70	32
10		
11		
12		
13		
14		

Figure 2: Excel provides no obvious method for plotting data such as this to a best-fit line — but it can be done with the TREND function and some creative charting.

a ball bounces as a function of the height from which it was dropped. From your test results, you've generated the table shown in Figure 2. You can generate a best-fit line graph for this information in the following way:

• Select cells C3 through C9, and choose Paste Function from the Formula menu.

• Select the **TREND** function from the Formula menu and click on OK. Excel will enter `=TREND()` into the formula bar, with the insertion point blinking between the two parentheses.

• Select the entries in the Height Bounced column, type a comma, select the information in the Height Dropped column, type another comma, and select the values in the Height Dropped column a second time. Your formula should now look like this:

```
=TREND(B3:B9,A3:A9,A3:A9)
```

• Press Command-Enter. Excel will calculate the information for the best-fit line and fill it into the selected cells. Your worksheet should then look like Figure 3.

• Select the numbers in all three columns, and copy them to the Clipboard. Now create a new chart: Make sure you're working with Full Menus, and select Paste Special from the Edit menu. Select Categories in First Column, and in the Values In box, select Columns. Click on OK, and the data is plotted as a bar chart. Next choose Scatter from the Gallery menu, and select the second layout. Excel draws a chart with two lines, one straight and one connecting the actual data.

• Select the line from the actual data by clicking on the line. Select Patterns from the Format menu, and click on Invisible for the Line pattern. Click on OK, and the lines connecting your data points will disappear.

The best way to make sure the titles in your extract range match the titles from your database is to copy the titles from your database directly to your extract range.

• Click on the straight line, select Patterns from the Format menu, and click on Invisible for the Marker pattern. To select a different line pattern for this line, click on OK again, and the points will be removed from your straight line.

• Finally, you can add a title and labels for the Category and Value axes by selecting Attach Text from the Chart menu. Select the desired label, and type it in.

• You can then add horizontal and vertical lines by selecting Gridlines from the Chart menu and clicking on Major Gridlines for the Category (*x*) axis and the Value (*y*) axis.

The resulting chart should look like Figure 4.

10. How can I insert more than one line of text into a chart label?

In the formula bar, press Command-Return. This creates a larger space in which you can type multiple lines of text.

11. When I link worksheets in Excel, how can I rearrange the data on the supporting worksheet without affecting the link?

Let's say you have a total in cell C5 of Worksheet1 (W1) that is linked to cell D7 in Worksheet2 (W2), using the formula `=Worksheet1!$C$5`. If you insert a row into W1, which pushes your total down to C6, the value in D7 of your second worksheet changes, because it's still linked to cell C5. You can adjust for rearrangements by using a name instead of a cell reference. For this example, select C5 in W1. Choose Define Name from the Formula menu, type in a name such as Total, and click on OK.

On W2, change your link to read `=Worksheet1!Total`.

Now if you cut and paste the value in C5 to some other area of W1 or insert rows that push C5 down, the name will follow the original value in C5 wherever it goes and the link will be properly maintained. Note: This *won't* work if you sort the rows into a new order.

12. How do I bring a color Excel chart into Word?

Select Print Using Color in the Excel Print dialog box (you have to Click on OK and then press Command-period to stop the print job). Then when you copy the color chart (by clicking on the outer edge of the chart window and choosing Copy) and Paste Link it into Word, the chart appears in color in Word and is updated in color. Copy Picture in the Shift-Edit menu in Excel also lets you bring a color chart into Word, but it lets you update the chart only in black-and-white.

13. How can I display in a cell the formula that produced a value?

Command-tilde (~) lets you toggle between showing a formula and displaying a value in a cell.

14. How do I delete formulas in selected cells on my spreadsheet while maintaining the values?

Select and copy the cells and, with the same cells selected, choose Paste Special from the Edit menu and select Values from the resulting dialog box.

Table

	A	B	C
1	Bouncing Ball		
2	Height Dropped (in cm)	Height Bounced (in cm)	
3	10	5	5.10714286
4	20	9	9.78571429
5	30	13	14.4642857
6	40	22	19.1428571
7	50	25	23.8214286
8	60	28	28.5
9	70	32	33.1785714
10			
11			
12			
13			
14			

Figure 3: Excel calculates best-fit information by using the TREND function . . .

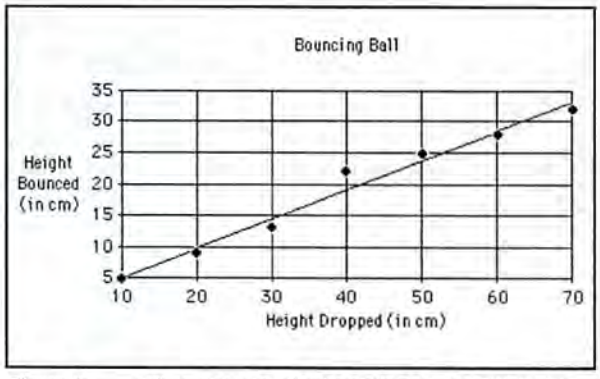

Figure 4: . . . and you generate the desired graph by plotting two lines — one with invisible markers and one with an invisible line.

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25182	Switchboard *(DataDesk)*	$174
25284	Trackball ADB *(Mouse Systems)*	$72
25280	Turbo Mouse Plus *(Kensington)*	$107
25281	Turbo Mouse ADB *(Kensington)*	$107
26880	Fanny Mac (fan) *(Mobius)*	$58
26888	System Saver Mac Plus *(Kensington)*	$62
26889	System Saver Mac SE *(Kensington)*	$62
26293	Powerchute Ntwk UPS Software *(A.P.C.)*	$99
26292	UPS, Uninterruptible supply *(A.P.C.)*	$207

Accessories

41753	Keyboard drawer *(CompuAdd)*	$19
41019	Kleen Keyboard Kit *(CompuAdd)*	$10
26883	SE Anti-Glare Filter (platinum) *(Kensington)*	$32
26882	SE Anti-Glare Filter (beige) *(Kensington)*	$32
26891	Apple RGB Anti-Glare Filter *(Kensington)*	$62
26886	HyperDialer *(DataDesk)*	$32
26895	Imagewriter II Dust Cover *(Cover-up)*	$8
26897	LaserWriter II Dust Cover *(Kensington)*	$12
26898	MacAvenue Carrying Case *(Pace)*	$65
26901	MacAvenue Carrying Case Ext. Kbd. *(Pace)*	$76
26892	Mac II Stand & Cable Kit *(Kensington)*	$63
26887	Mac II System Stand *(Kensington)*	$20
26894	Mac Plus/SE Dust Cover *(Cover-up)*	$8
26893	Masterpiece Mac II *(Kensington)*	$103
26896	Universal Printer Stand *(Kensington)*	$15
25580	Mac II Monitor Stand *(Kensington)*	$62
25582	Tilt/Swivel Stand *(Kensington)*	$23
26884	Security Kit *(Kensington)*	$33
41752	Teak KB Drawer PSK 132 *(CompuAdd)*	$72
26903	The Library (grey) *(Innovative Technology)*	$12
41026	Vacumn w/hose *(CompuAdd)*	$49
41035	Datavac Bags *(5pk)*	$2.95
41131	Eleven Piece Tool Kit *(CompuAdd)*	$12
57440	Sony 3.5" Diskettes 1.2MB 10Pk *(Sony)*	$29
57804	Tape Cart: Bernoulli B33C 44MB *(Bernoulli)*	$82

Sound Interfaces

23730	MacRecorder *(Farallon)*	$162
23732	MIDI Interface *(Passport Designs)*	$76

Software

Writing & Publishing

Word Processing (Writing)

30600	FullWrite Prof. *(Ashton-Tate)*	$253
30586	MacWrite II 1.1 w/ ATM *(Claris)*	$157
30582	Microsoft Word *(Microsoft)*	$245
30580	Microsoft Works *(Microsoft)*	$177
30584	Microsoft Write *(Microsoft)*	$77
30602	Nisus *(Paragon Concepts)*	$236
30591	WordPerfect Mac *(WordPerfect)*	$229
30588	WriteNow *(T/Maker)*	$116

Page Layout (Publishing)

29792	Letraset Ready-Set-Go *(Letraset)*	$273
29781	Pagemaker *(Aldus)*	$497
29822	Publish-it *(Timeworks)*	$223
29802	Quark Xpress 2.11 *(Quark)*	$455
29796	Silicon Press *(Silicon Beach)*	$51
29814	Springboard Publisher *(Springboard)*	$107

Utilities for Writers/Publishers

30606	Acta Advantage *(Symmetry)*	$63
30618	Big Thesaurus1.0 *(Deneba Software)*	$63
30594	Findswell *(Working Software)*	$35
30440	Letter Writer Plus *(Power Up)*	$54
29820	MacKern *(ICOM Simulations)*	$113
30605	More II *(Symantec)*	$265
29786	PageMaker Color Ext. *(Aldus)*	$133
29800	QuarkStyle 1.0 *(Quark)*	$165
30598	QuickLetter *(Working Software)*	$72
30622	WordFinder 2.0 *(Microlytics)*	$31

Spelling Checkers

30620	Spelling Coach Pro 3.1 *(Deneba Software)*	$112
30596	Spellswell *(Working Software)*	$44

Fonts & Font Utilities

	Adobe Fonts All 134 available	CALL
30444	Freedom of Press *(Custom Applications)*	$255
29824	Type Manager *(Adobe)*	$55
29828	Type Mgr/Type Align *(Adobe)*	$88
29830	Type Reunion *(Adobe)*	$38
29826	TypeAlign *(Adobe)*	$58

Business Software

Integrated & Bundled Applications

30182	Microsoft Office Bundle *(Microsoft)*	$525
30580	Microsoft Works *(Microsoft)*	$177

Accounting/Bookkeeping

28481	Accountant Inc. Prof *(Softsync)*	$348
28466	Business Sense *(Monogram)*	$265
28468	Checkwriter II *(Aatrix)*	$37
28464	Dollars & Sense *(Monogram)*	$78
28474	Easy-Light *(DAC)*	$41
28440	Insight Accounts Payable *(Layered)*	$395
28442	Insight Accounts Receivable *(Layered)*	$395
28454	Insight At Once *(Layered)*	$283
28444	Insight General Ledger *(Layered)*	$395
28446	Insight Inventory *(Layered)*	$395
28448	Insight Payroll *(Layered)*	$395
28450	Insight Time Bill *(Layered)*	$395
28478	MacMoney 3.5 *(Survivor Software)*	$58
28462	Managing Your Money *(Meca)*	$122
28458	Quicken *(Intuit)*	$36

Data Analysis & Presentation

28470	StatView II (Mac+,SE, II)*(Abacus Concepts)*	$278
28472	StatView SE + Graphics *(Abacus Concepts)*	$199

Database

27780	4th Dimension *(Acius)*	$511
27782	4th Dimension Runtime *(Acius)*	$85
27789	Claris Filemaker II*(Claris)*	$216
27804	Double Helix *(Odesta)*	$369
27790	FoxBase II *(Fox Software)*	$292
27792	FoxBase II Runtime *(Fox Software)*	$176
27796	FoxBase Mltuser Runtime *(Fox Software)*	$293
27794	FoxBase Multiuser *(Fox Software)*	$385
27798	Microsoft File *(Microsoft)*	$123
27808	Panorama (ProVue)	$246

Time & Project Scheduling

29744	Fast Track Schedule *(AEC)*	$108
27810	KeyPlan *(Symmetry)*	$243
29740	MacProject II 1.1 *(Claris)*	$366

Office Productivity Programs & Utilities

30442	Address book Plus *(Power-up)*	$52
27812	BulkMailer 3.3 *(Satori Software)*	$76
27814	BulkMailer Plus *(Satori Software)*	$187
30432	Calender Creater + Mac *(Power Up)*	$36
30358	Calender Maker *(CE Software)*	$30
27818	Data Desk 3.0 *(Odesta)*	$347
30438	Fast Forms 2.0 *(Power-up)*	$116
30372	Kiwi Envelopes *(Kiwi Software)*	$34
30440	Letter Writer Plus *(Power Up)*	$54
27816	MailList *(MySoftware)*	$27
27806	Milo (Paraconp)	$156
29200	Smartforms Designer *(Claris)*	$294

Spreadsheet Programs & Templates

30180	Excel 2.2 *(Microsoft)*	$245
30186	Full Impact *(Ashton-Tate)*	$245
30580	Microsoft Works *(Microsoft)*	$177
30184	Wingz *(Informix)*	$245
28476	101 Macros for Exel *(Individual Software)*	$35

Communications

On the Modem

27708	Carbon Copy Mac *(Microcom)*	$119
27702	CompuServe Info Serv *(CompuServe)*	$23
27705	CompuServe Navigator 3.0 *(CompuServe)*	$49
27706	Connect v. 1.5 *(Connect)*	$93
27672	Desktop Express *(Dow Jones)*	$94
27710	LapLink 2.0 *(Traveling Software)*	$119
27660	Microphone II *(Software Ventures)*	$213
30580	Microsoft Works *(Microsoft)*	$177
27670	News/Retreival Membership *(Dow Jones)*	$23
27662	SmartCom II *(Hayes)*	$84
27668	Timbuktu Remote *(Farallon)*	$123
27664	White Knight *(Freesoft)*	$89

On the Network

27700	In/Out 10 User *(CE Software)*	$187
27698	In/Out 5 User *(CE Software)*	$125
27690	InBox Connection *(Tops)*	$41
27688	InBox Starter *(Tops)*	$143
27680	MS Mail 20 Pack *(Microsoft)*	$959
27678	MS Mail Server *(Microsoft)*	$246
27676	MS Mail Workstation *(Microsoft)*	$83
27686	NetPrint v. 2.0 *(Tops)*	$115
27696	Quickmail 10 Pack *(CE Software)*	$313
27695	Quickmail 5 User v2.2 *(CE Software)*	$210
27692	Quickmail Remote *(CE Software)*	$32
27666	Timbuktu 3.0 *(Farallon)*	$95
27685	Tops Network Bundle/DOS *(Tops)*	$159
27682	Tops Network Bundle/Mac *(Tops)*	$187
27674	TraffieWatch *(Farrallon)*	$127

Education & Entertainment

On the Learning Curve

27948	Animal Kingdom *(Unicorn)*	$26
27956	Atlas Explorer *(Springboard)*	$27
27964	Calculus *(Broderbund Software)*	$57
27976	Dinosaur Discovery Kit *(Byte)*	$26
27982	First Shape *(Byte)*	$31
27962	Geometry *(Broderbund Software)*	$57
27990	KidsMath *(Great Wave)*	$25
27988	KidsTime *(Great Wave)*	$24
27952	MacRobots *(Unicorn)*	$26
27968	Math Blaster! *(Davidson & Associates)*	$29
27970	Math Blaster Mystery *(Davidson & Assoc.)*	$27
27950	Math Wizard *(Unicorn)*	$26
27992	NumberMaze *(Great Wave)*	$25
27966	Physics *(Broderbund Software)*	$57
27974	Puzzle Storybook *(Byte)*	$26
27954	Read-A-Rama *(Unicorn)*	$31
28000	Reader Rabbit *(Learning Company)*	$30
27972	Speed Reader II *(Davidson & Associates)*	$29
27984	Speller Bee *(Byte)*	$31
28002	Talking Math Rabbit *(Learning Company)*	$31
27986	TimeMasters *(Great Wave)*	$21
27958	Type! *(Broderbund Software)*	$18
28014	Typing Instructor Encore *(Individual Software)*	$15
28008	Typing Tutor *(Simon & Schuster)*	$28
28004	Voyager *(Carina Software)*	$87

Just for the Fun of It (Games)

28692	4th and Inches *(Accolade)*	$26
28668	Ancient Art of War *(Broderbund)*	$25
28670	Ancient Art of War at Sea *(Broderbund)*	$25
28648	Apache Strike *(Silicon Beach)*	$31
28632	Balance of Power 1990 *(Mindscape)*	$31
28654	Bard's Tale *(Electronic Arts)*	$30
28646	Beyond Dark Castle *(Silicon Beach)*	$31
28738	Bomber *(In-Line Design)*	$25
28656	Chuck Yeager Flight Sm *(Electronic Arts)*	$30
28634	Colony *(Mindscape)*	$28
28700	Cosmic Osmo *(Activision)*	$40
28638	Crossword Magic *(Mindscape)*	$28
28704	Crystal Quest 2.2T *(Casady & Greene)*	$24
28706	Crystal Quest 2.2T w/edit *(Casady&Greene)*	$39
28650	Dark Castle *(Silicon Beach)*	$32
28636	Deja Vu II *(Mindscape)*	$28
28614	Falcon *(Spectrum Holobyte)*	$30
28684	Ferrari Grand Prix *(Bullseye)*	$32
28682	Fokner Tri-plane *(Bullseye)*	$23
28612	GATO *(Spectrum Holobyte)*	$25
28642	Gauntlet *(Mindscape)*	$28
28688	Hardball *(Accolade)*	$25
28618	Hidden Agenda *(Springboard)*	$35
28620	JET *(SubLogic)*	$31
28724	Kings Quest 1 *(Sierra-On Line)*	$28
28726	Kings Quest 2 *(Sierra-On Line)*	$28
28728	Kings Quest 3 *(Sierra-On Line)*	$28
28714	Leisure Suit Larry 1 *(Sierra-On Line)*	$23
28658	Life & Death *(Electronic Arts)*	$31
28624	Lunar Rescue *(XOR)*	$32
28730	Mac Wizardry *(Sir-Tech)*	$34
28708	MacGolf *(PCAI)*	$33

Just for the Fun of It (Games) *(continued)*

28628	MacGolf Classic *(XOR)*	$51
28722	Man Hunter NY *(Sierra-On Line)*	$28
28696	Manhole *(Activision)*	$28
28698	Manhole (CD ROM) *(Activision)*	$34
28690	Mean 18 *(Accolade)*	$25
28630	NFL Challenge *(XOR)*	$53
28686	P51 Mustang Flight Simulator *(Bullseye)*	$32
28720	Police Quest I *(Sierra-On Line)*	$28
28610	PT-109 *(Spectrum Holobyte)*	$25
28694	Quarterstaff *(Activision)*	$30
28652	Reach for the Stars *(Electronic Arts)*	$25
28626	Road Racer *(XOR)*	$39
28616	Sargon IV *(Spinnaker)*	$29
28640	Shadowgate *(Mindscape)*	$28
28666	Shufflepuck Cafe *(Broderbund)*	$22
28678	SimCity *(Broderbund)*	$28
28680	SimCity Supreme *(Broderbund)*	$47
28710	SpaceQuest *(Sierra-On Line)*	$28
28712	SpaceQuest II *(Sierra-On Line)*	$28
28664	Star Wars *(Broderbund)*	$23
28622	TaskMaker *(XOR)*	$26
28606	Tetris *(Spectrum Holobyte)*	$18
28608	Tetris—Color Version *(Spectrum Holobyte)*	$21
28660	Hunt for Red October *(Software Toolworks)*	$31
28644	Uninvited *(Mindscape)*	$28
28604	Welltris *(Spectrum Holobyte)*	$19
28672	Where/ Carmen Sandiego *(Broderbund)*	$28
28674	Where/Europe Carmen *(Broderbund)*	$28
28676	Where/USA Carmen *(Broderbund)*	$28
28662	Starfleet *(Electronic Arts)*	$35

Music & Sound

27998	ConcertWare + MIDI *(Great Wave)*	$98
27960	Jam Session *(Broderbund)*	$29
27978	SmoothTalker *(Byte)*	$31

The Graphic Arts

Mostly Drawing

29232	Canvas *(Deneba Software)*	$186
29206	ClarisCAD 1.0 *(Claris)*	$589
29234	Cricket Draw *(Cricket)*	$169
29238	Dreams 1.1 *(Innovative Data Design)*	$315
29784	Freehand 2.0 *(Aldus)*	$326
29788	Illustrator 88 *(Adobe)*	$275
29240	MacDraft *(Innovative Data Design)*	$167
29204	MacDraw II 1.1 w/ ATM *(Claris)*	$291
29222	SuperPaint *(Silicon Beach)*	$129

Mostly Painting

29236	Cricket Paint *(Cricket)*	$176
29202	MacPaint II 2.0 *(Claris)*	$94
29228	PixelPaint *(Supermac)*	$223
29230	PixelPaint Pro *(Supermac)*	$387

Mostly Graphics Editing

29224	Digital Darkroom *(Silicon Beach)*	$260
29790	ImageStudio *(Letraset)*	$273
29218	Model Shop *(Paracomp)*	$378
29266	Photoshop *(Adobe)*	$498
29242	Studio/1 *(Electronic Arts)*	$95
29244	Studio/8 *(Electronic Arts)*	$295
29226	Super3D *(Silicon Beach)*	$313
29220	Swivel 3D *(Paracomp)*	$294
29212	Videoworks II Accelerator *(Macromind)*	$119
29210	Videoworks II Hypercard *(Macromind)*	$60

Graph & Chart Makers

29806	Cricket Graph 1.3 *(Cricket)*	$113
29260	DeltaGraph *(DeltaPoint)*	$97

Presentation Managers

29258	Accelerator *(Macromind)*	$124
29804	Cricket Presents 2.0 *(Cricket)*	$283
29216	Director *(Macromind)*	$436
29782	Persuasion *(Aldus)*	$327
29798	PowerPoint 2.01 *(Microsoft)*	$246

Certificate & Award Generators

29810	Certificate Library *(Springboard)*	$17
29808	Certificate Maker *(Springboard)*	$21
29812	Top Honors *(Springboard)*	$57

Graphic Utilities, etc.

29794	LetraStudio *(Letraset)*	$273
29264	Curator *(Solutions Int'l)*	$71
30380	SmartScrap & Clipper *(Solutions Int'l)*	$45

Graphic Art Collections

29252	Click Art Business *(T/Maker)*	$32
29256	Click Art Christian *(T/Maker)*	$37
29254	Click Art Holidays *(T/Maker)*	$32
29818	EPS Business Art *(T/Maker)*	$82
29816	EPS Illustrations *(T/Maker)*	$83
29246	Smart Art 1 *(Adobe)*	$83
29248	Smart Art 2 *(Adobe)*	$83
29250	Smart Art 3 *(Adobe)*	$83

Optical Character Recognition

30610	OmniPage 2.0 *(Caere)*	$535

Do It Yourself Programming

30426	101 Scripts&Buttons *(Individual Software)*	$35
27582	Just Enough Pascal *(Symantec)*	$46
27588	Prototyper *(Smethers Barnes)*	$183
27590	QuickBasic *(MicroSoft)*	$64
27580	Supercard *(Silicon Beach)*	$127
27586	THINK C *(Symantec)*	$163
27584	THINK Pascal v3.0 *(Symantec)*	$160
30416	TMON *(Icom Simulation)*	$87
27592	Turbo Pascal *(Borland)*	$67

Safety, Maintenance & Repair Utilities

Data Organization

30354	DiskTop 4.0 *(CE Software)*	$63
30434	On Location *(On Technologies)*	$75
30402	Suitcase II *(Fifth Generation)*	$43

Data Storage Management & Repair

30420	Complete Undelete *(1st Aid Software)*	$36
30362	Copy II Mac *(Central Point)*	$22
30410	Disk Tools Plus *(Electronic Arts)*	$31
30422	DiskExpress II 2.0 *(ALSOFT)*	$54
30392	DiskFit *(SuperMac Software)*	$58
30404	FastBack *(Fifth Generation)*	$106
30375	INITPicker *(Microseeds Publishing)*	$39
30364	Mac Tools 1.0 *(Central Point)*	$43
30394	Network DiskFit *(SuperMac Software)*	$223
30436	Norton Util/Mac *(Norton Utilities)*	$79
30378	Redux *(Microseeds Publishing)*	$51
30384	Retrospect *(Dantz Development)*	$152
30340	Sum II *(Symantec)*	$92
30344	xTree Mac *(xTree)*	$52

Shortcut & Time Saving Utilities

30348	CanOpener *(Abbott Systems)*	$63
30430	Clip Share 1.0 *(Olduvai)*	$138
30388	LaserSpool *(SuperMac)*	$87
30390	LaserSpool 5-Pack *(SuperMac)*	$286
30428	MacPrint 1.1 *(Insight Development)*	$94
30360	MockPackage Plus Util. *(CE Software)*	$30
30408	On Cue *(Icom Simulations)*	$35
30400	PowerStation *(Fifth Generation)*	$33
30356	QuickKeys *(CE Software)*	$62
30418	Shortcut *(Alladdin)*	$45
30382	SuperGlue *(Solutions Int'l)*	$61
30386	SuperSpool *(SuperMac)*	$58
30352	Tempo II *(Affinity Microsystems)*	$97

Data Security Utilities

30406	DiskLock *(Fifth Generation)*	$106
30370	MacSafe II *(Kent marsh LTD)*	$105
30366	QuickLock v1.0 *(Kent marsh LTD)*	$55
30396	Sentinal *(Supermac)*	$86
30368	The Night Watch v1.03 *(Kent marsh LTD)*	$85

Screen Saver Utilities

30424	After Dark *(Berkley Systems)*	$24
30399	Pyro *(Fifth Generation)*	$21

Virus Detectors & Eradicators

30342	SAM *(Symantec)*	$63
30413	Virex *(HJC Software)*	$51
30414	Virex (10 Pack) *(HJC Software)*	$346

Other Utilities

30350	Affinifile *(Affinity Microsystems)*	$44
30376	Screen Gems *(Microseeds Publishing)*	$39

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2 x 1MB SIMMs (80ns)	*25480*—$138
4 x 1MB SIMMs (80ns)	*25842*—$276

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This expansion board uses the expansion slot of your Mac Portable to give you the RAM you need for powerful applications. And, even though it gives you all the power you need, this board prolongs your battery life because of its low power requirements and a sleep mode that operates at a ridiculously low 3-4 milliAMPs. You'll have the option to continue expanding your Portable's RAM in 1MB increments without blocking other Mac Portable slots.

Applied Engineering 1MB expansion card	*25487*—$535

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Think C's fast compiler and linker shrink programming time. Devise new applications, DAs, INITs, drivers or HyperCard functions in Think C's powerful but flexible programming environment.

THINK C 4.0	*27586*—$163

Playing With Type

BroderBund's TypeStyler is a handy typographical utility that gives you the power to create display type from the usual typefaces. The TypeStyler Package includes 10 typefaces. Supports 8-bit color and lets you output process color separations.

Broderbund TypeStyler	*30450*—$115

Special Printing Effects

A convenient program designed to print greeting cards, signs or other special displays from your Macintosh. Includes fonts, clip art and decorative borders to dress up the images.

Broderbund Print Shop	*29836*—$35

MacAvenue's Leasing Program

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Input

Configure It Out Yourself

The new SwitchBoard from DataDesk gives you the option to configure your keyboard just as you've always wanted it to be. Rearrange the keyboard, cursor keys and numeric keypad. Or add the optional SwitchBall and function key modules to complete your data input options.

SwitchBoard	*25182*—$174
SwitchBall	*25183*—$115
15-function key module	*25184*—$37

Turbo Powered Mouse

If you're looking for a mousing alternative, join the thousands of Mac users who've chosen the Kensington Turbo Mouse. One of the most popular trackballs on the market, it senses your movements and adjusts cursor speed while giving you precise cursor control.

Kensington Turbo Mouse ADB	*25281*—$167

Network

Who Put the NET in Network?

When someone is talking about a Macintosh network, they're talking about Farallon PhoneNET connectors. You can't have a network without them. And it's better to have a few extras on hand because there's always someone else who wants to get connected.

PhoneNET Din-8	*22513*—$31
PhoneNET DB-9	*22511*—$34
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SUITCASE II:

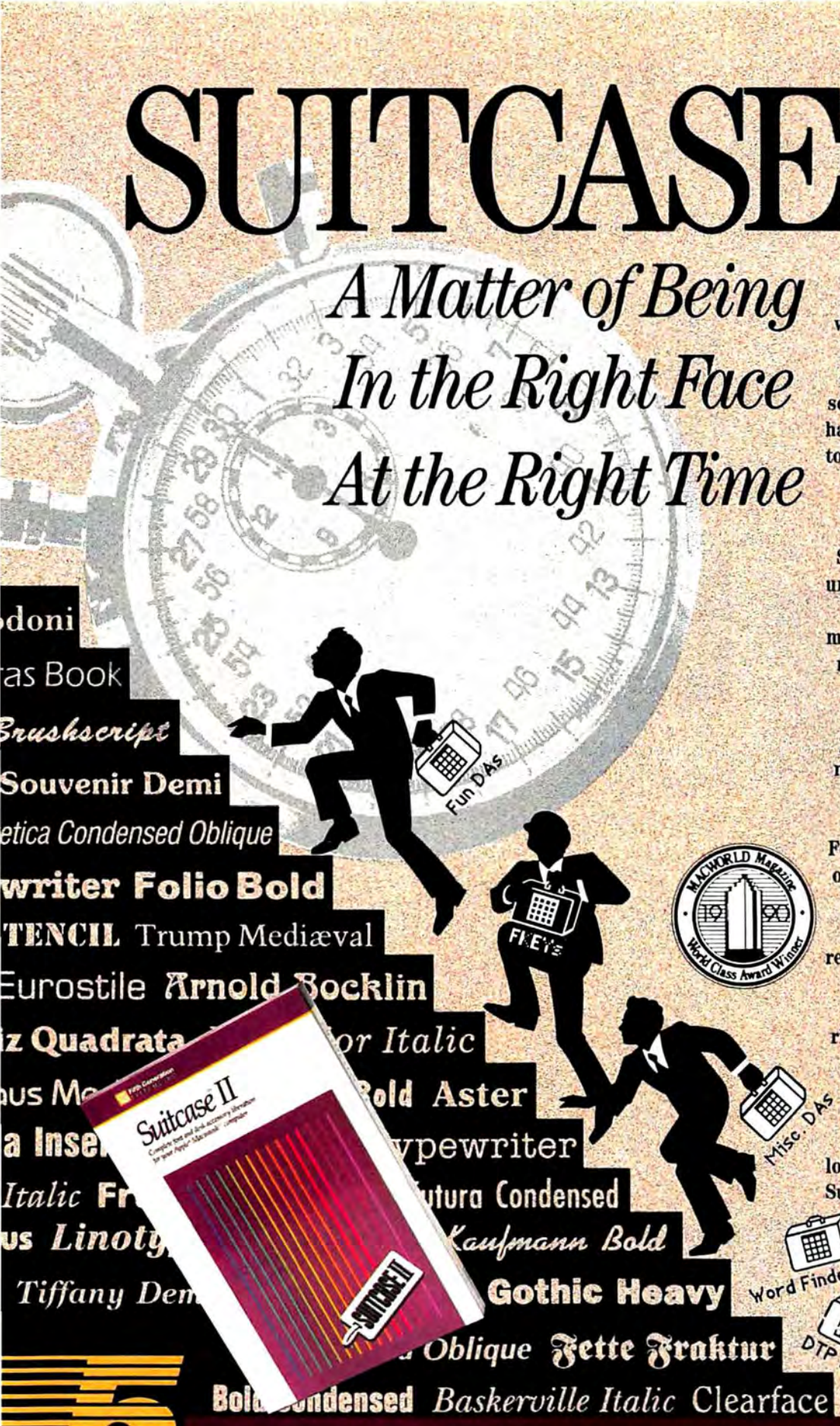
A Matter of Being In the Right Face At the Right Time

Suitcase II is the award-winning software that gives you unlimited access to *all* your fonts and desk accessories, *all* the time. Without having to use Font/DA Mover to install and deinstall them. Without cluttering up your system file.

Suitcase II lets you view an unlimited number of fonts *in their own typefaces* at any moment, so you can pick the right face at the right time, without breaking stride. You'll never have to reboot your Macintosh to install a new font, or search through a cluttered System File to find what you need. Font ID conflicts are a thing of the past with Suitcase II.

And you'll never have to restart your system to install a Desk Accessory, because whatever you need will be right in your face, whenever you need it!

So why spend your time juggling fonts and DAs any longer? Now is the time to put Suitcase II on *your* Macintosh!



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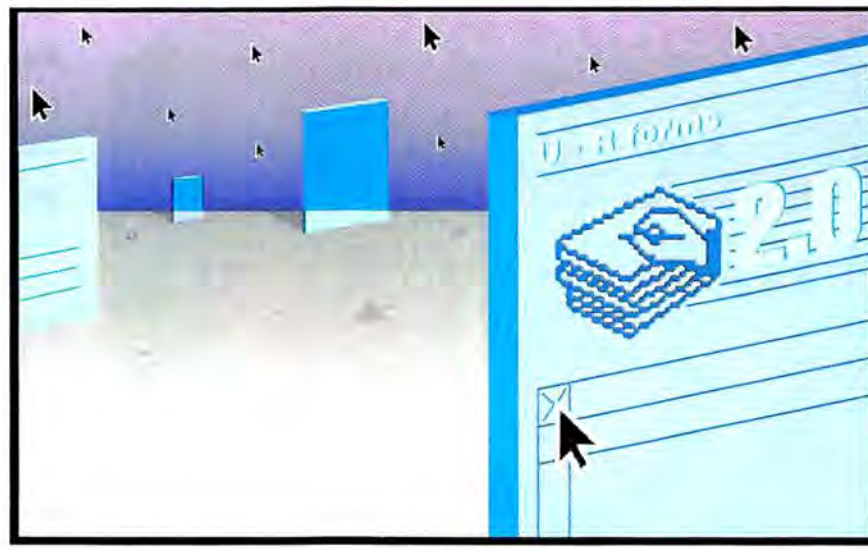
Build a Forms Generator

HyperCard would be among the last products one would think of using for forms design — until now.

By Michael Swaine



This month's column is about a do-it-yourself project. We're going to build a forms generator.

There's a large class of documents that are more complex than typical word-processing documents and less complex than typical page-layout documents. Most of a business's standard forms fall into this class: invoices, inventory forms, price lists. And there are the not-so-standard forms: all those documents too infrequently produced to be printed up in batches, too simple to justify using a page-layout program, and yet too complicated for a word processor. It would be handy to have a program that let you design such documents easily, flexibly, and cheaply.

The program should permit free placement of text on the page; for example, it should let you put a multicolumn block of left-justified text next to a block of single-column, right-justified text in a different font. It should be able to pull data in from several files, automatically. It should support template design, so that a new version of a document is generated when data in its supporting files is updated. And it would be nice if it had the programmability of a spreadsheet, so that a document could, for example, compute and include a due date 30 days after the date when the document is printed.

No existing program does all these things. Word processors don't provide enough flexibility in the placement of text on the page. Page-layout programs, such as PageMaker, QuarkXPress, and FrameMaker, allow precise control over the placement of elements on the page, as do integrated products such as Ragtime and Trapeze, but these products don't support a template approach. Forms-design packages such as Claris SmartForms, specifically designed to do this job, are the tools to use if you do a lot of forms design. But they require a commitment of money and time, and they aren't programmable the way a spreadsheet is.

Or the way that HyperCard is. Until recently, HyperCard would be among the last products one would think of using for forms design. Support for any kind of printing in HyperCard versions 1.0 through 1.2.5 was legendarily poor. Version 2.0, though, is a different story: Its report-printing capability is just what this project requires. And HyperCard is cheap.

Here's a step-by-step tutorial on creating a forms generator in HyperCard 2.0.

You'll need test data for checking out your forms generator, so save a file from a word-processing program in text-only format. Call it "text," and put it into the same folder as HyperCard. Then open HyperCard 2.0.

When you open HyperCard, you see the Home Stack. In earlier versions, it contained five cards, but now it contains nine. Navigate to the last card (pressing the left-arrow key is one way), where you can move a vertical slider control to change the user level from 1, browsing, at the bottom, to 5, scripting, at the top. The higher the user level, the more you can do. Run the slider all the way to the top.

Pull down the File menu, and select New

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Forms-design packages are the tools to use if you do a lot of forms design. But they require a commitment of money and time, and they aren't programmable the way that HyperCard is.

Stack. In the dialog box that pops up, give your stack a name and adjust the card-image rectangle at the right to set the stack's card size. (HyperCard cards can now be different sizes, although you can have only one size per stack; if you don't like the size you set now, you can easily change it later.) It doesn't need to be very big — try 96 x 64 pixels. With such a small window, the stack should have a short name; call it Form. Click on New.

You're now looking at your form generator, a tiny, entirely empty window. It's going to stay empty. Building a HyperCard stack usually means positioning a lot of buttons and text fields, but you won't need any of those. Pull down the File menu, and select Print Report.

What you see is the Report dialog box. You're going to create a report template, but some of what you see here is not relevant, because it assumes you're printing cards from the stack. Since you're going to ignore the stack, you can also ignore the All cards/Marked cards setting as well as the settings for print order, fixed versus dynamic height, and spacing. You do want to set the page margins and run the record size out to the maximum (to fill the page). Type in a header if you like, clicking on the appropriate buttons if you want to include the print date and/or time.

Pull down the Edit menu, and select Report name, which lets you give the report template a name. You can store many report templates in this stack, so you need to name them in order to keep them straight.

The rest of the process of creating the report template consists of creating individual report items, which are the fields into which data will be placed. Pull down the Edit menu again, and select Report Items.

Example 1

```
function getData sourceFile,chunkNum,chunkType
  --
  -- Function getData returns the chunkNum-the chunk
  -- of text from the text file sourceFile, a chunk
  -- being defined by its chunkType.
  --
  -- ChunkType names the character that separates,
  -- or delimits, chunks. It can be "return," "tab,"
  -- or "comma." "Return" and "tab" are predefined
  -- in HyperCard, but we must define "comma."
  put "," into comma
  -- "Return" is the default if nothing is supplied.
  if chunkType is empty
  then put "return" into chunkType
  -- We don't want the literal string "comma," but
  -- the character it represents; i.e., its value.
  put value(chunkType) into delim
  -- ChunkNum tells which chunk of the file we want.
  -- We read that many such chunks from the file.
  open file sourceFile
  repeat for chunkNum
    read from file sourceFile until delim
    put it into sourceText
  end repeat
  close file sourceFile
  -- The final chunk read is stored in sourceText
  -- and returned as the value of function getData.
  return sourceText
end getData
```

For each text field you want in your report, you need to create an item, size it, position it on the page, and fill in the item information, which will determine the item's contents and format. To create an item, select New Item from the Items menu. A rectangle appears. To size and position an item, drag its rectangle around on the page.

To fill in the item information, select the item by clicking on its rectangle and select Item Info from the Items menu. This brings up another dialog box, most of which is concerned with the text formatting for the item. You can set the font, size, style, leading, and alignment (you can choose right, left, or center, but not fully justified or decimal-aligned). You can also set the number of columns for this item: Individual items can wrap around several columns. These settings apply to all the data in the item, so if you want to center a 12-point heading over a block of 10-point left-justified text, you need to create two items.

You specify the item's contents in the text box labeled "Contents of item" near the top of the dialog box. The assumption is that you will get the text for the item from a text field in the stack, and the scrolling list box below this box would let you choose from these fields if there were any. But you are not constrained to get your text from a HyperCard field or even from this stack. You can put into this box any expression that HyperCard is able to interpret.

Put this into the box:

```
getData("text",1)
```

This retrieves paragraph 1 from your text file "text" and puts it into the item. Now create two more items, give them different fonts, position them, and put the following into their contents boxes:

```
getData("text",2)
```

and

```
getData("text",3)
```

which do exactly what you think: They put paragraphs 2 and 3 of your text file into their respective items. If you called your text file something other than "text," substitute that name. If you want to use a

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System 7.0 Watch: The Read Balloon

More thought goes into the documentation of nearly every Mac application than into almost any other consumer or business product. Mac developers can pat themselves on the back for the quality of their documentation, compared with that for, say, answering machines and faxes. And when they've finished congratulating themselves, they should get busy improving their documentation, because just being better than fax and answering-machine documenters is nowhere near good enough. Software keeps getting more sophisticated and complex, and its help needs help.

Application developers need to cure themselves of the delusion that an item-by-item explanation of the application menus constitutes adequate documentation, for example. It's one part of the documentation but not the main part. And the explanation doesn't belong in a printed manual but in the product itself.

The help tools built into System 7.0 should help application developers create on-line documentation for their applications. The first encounter you'll have with the use of these tools will doubtless be the balloon-help documentation for Finder 7.0.

Balloon help is a mode that you enter or leave by clicking on a question-mark icon that is always present in the System 7.0 menu bar. As you move around the screen, balloon help explains anything you point at. You don't have to click the mouse button; the explanations are triggered simply by movement of the pointer across an icon, menu header, menu item, window, or window component. Almost anything you can point at has an explanation, although in some cases, the help explanations are generic, explaining, for example, what a window is rather than what this particular window's function is. But pointing at a dimmed menu item not only produces an explanation of what the item does but it also gets you a statement that the dimmed appearance of the menu means that it is not currently available and possibly even an explanation of why it's not available.

The explanations are displayed in pop-up word balloons just like those in which comic-book characters express themselves. The balloon for an object appears as soon as the pointer passes over the object and disappears when it moves off it. Cute as the word balloons are, the metaphor is the result of some serious human-interface-design thinking. Each balloon is sized and shaped to display its text in a classic golden rectangle, the ancient Greeks' idea of a beautiful shape. And the tail of the word balloon points to the object it belongs to, a human-interface-design touch that has been tested for more than 60 years in comic books and comic strips. (And you probably thought that it was Dick Tracy's wrist-radio that was pointing the way toward the future.)

Balloon help is just one part of the new Help Manager built into System 7.0. It's designed to handle the necessary, but not central, documentation problem of annotating the elements of the application. Balloon help is for telling what the object is or what its function is. Other help tools are intended to support more-complex task-oriented documentation. We'll see them put to use later. Balloon help's functionality is more immediately useful to third-party developers, and its success will depend on what third-party developers do with it. To put a little more pressure on developers who might be feeling lazy, I'll tell you just how easy it will be for them to add balloon help to their applications.

Application developers don't need to write any specialized help code to add balloon help to an application. Adding balloon help is just a matter of creating the text and putting it into new help resources in the application. These resources can be associated with (and hence can document) active or inactive windows or applications, individual parts of windows, menus, dialog boxes, and other objects. With a little coding, ambitious application developers can also customize balloon help, displaying color pictures in the balloons, for example.

There's no reason for application developers not to add balloon help to their applications as soon as System 7.0 is released.

Users might also have reasons to modify the help text in an application. It won't be hard. Is there something you just can't remember about a tool in one of your occasional applications? Annotate it in its balloon resource.

Balloon help is only the first you'll see of the help capabilities built into System 7.0, and the what-is-this help it provides is only one of the kinds of on-line help that users of complex applications need. Eventually users should have a rich set of alternatives for getting on-line help with applications, including a choice of viewpoints and authors ("Show me what my favorite documenter says about this tool" or "So-and-so is usually insightful about font issues; show me her comments on my present problem"), levels of depth and of assumed experience (these are not the same thing, and application developers should not assume that users will defer exploring the deeper levels of the application until they have become experts), sensory modalities (talk to me, draw me a picture, don't tell me if you can show me), and a choice of kinds of help (contextual tips and tricks, hints, cross-references, shortcuts, definitions of terms, task-oriented solutions, functional explanations, and maps). Balloon help is one small bootprint in this largely untrodden terrain.

text file that is not in the folder with HyperCard, substitute its full pathname, such as `hardDiskName:WPFolder:documentFolder:text`. If you want paragraphs other than the first three, substitute the appropriate numbers for 1, 2, and 3. Click on OK, and then click on Cancel to return to the stack, answering Yes to the prompt about saving your changes. Don't click on Print; you're not ready for that yet. There is one more thing to do.

It would be nice if HyperCard had a `getData` function, but it doesn't. You'll have to supply it yourself. Here's how you do that.

Press the Command and Option keys while you type S to invoke the script editor on the script of this stack. The blank window shows that the stack has no script, but you're going to change that.

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Users and Winners

The winner of April's puzzle will be announced next month. As mentioned in the June issue (page 251), Danny Goodman was the wild-eyed optimist who thought the 128K Mac would live forever.

The May puzzle asked, "How heavy is a megabyte?" and was won by George Taniwaki, whose table of capacities, weights, and efficiencies of 39 different media ran in the August issue (page 239), but new numbers keep fluttering in. I'll share some of the more entertaining ones next month.

The winner of the June puzzle is Gary Newman, of Petaluma, California, who correctly identified the wild-eyed optimists who thought the Mac II would live forever as *MacUser* contributing editors Thom Hogan and Michael Swaine, writing about the now-obsolete machine in their now-obsolete newsletter *The Macintosh II Report*.

The July puzzle, "Ten Little Arrows," sparked a lot of guesses about what application I was using as I wrote that month's column. Some were more reasonable than others: Does anyone really believe that I write this column in HyperCard or 4th Dimension? The correct answer is that I was using Microsoft Word and a utility discussed in that column, Scroll2, that doubles up the scroll-bar arrows. Nobody got it right.

The system-shrinking puzzle from the December '89 issue (page 226) continues to generate more questions than solutions, and so I'm reprising it here.

Send me your minimum System: the smallest usable System file you can create, using Font/DA Mover, ResEdit, or whatever tools you wish. Include the shrunken size and the version number of the System file, precise details of what you did to make it small, and the model of Mac you're using. And don't hold me or *MacUser* responsible for what happens if you try to use your shrunken System. This is *research*.

As usual, the winner will receive a nifty all-cotton "I Beat the System" T-shirt. State your size in your entry — or perhaps one size too large. You know how those things shrink.

Send your solution to:
Michael Swaine
c/o *MacUser*
950 Tower Lane
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Foster City, CA 94404

Type the script in Example 1, proofread it carefully, and then press Command-S to save it and Command-W to close the editor. (You don't have to enter the comments, which are the lines beginning with two hyphens. They might be helpful, though, if you intend ever to modify the script.)

When you select Print Report from the File menu, the items in the report template invoke your `getData` function, and it picks out the specified paragraphs from the file. Text-format files produced by Mac word processors delimit paragraphs with the Return character, but Return delimits individual lines in a list too, so you can also use this function to select such lines.

To test the report template you've created, select Print Report and this time let it print. If you don't like the results, go back and edit the report template. Subsequently you can generate new reports from the same template by saving new data to the text file. Or to a different file: If there aren't too many items, it's easy enough to change the file reference in the items when you print.

But this is all just text: It would be nice to be able to incorporate data from a database file or a spreadsheet as well. That's not hard, although you should note that `getData` can't bring in formatted groups of cells from a spreadsheet or database. The report template does all the formatting and lets you plug only individual database fields or spreadsheet cells into its items. Here's how you do that.

The database or spreadsheet program you're using should let you save data to files in either comma-delimited or tab-delimited format. Do that. These are

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BEATING THE SYSTEM

standard text formats for nontext data, and the `getData` function can deal with them. Once you've saved the database or spreadsheet data in one of these formats, you can create report items to accommodate the data. For comma-delimited data, add a comma and the quoted word *comma* to the `getData` reference:

```
getData("anotherFile",3,"comma")
```

For tab-delimited data, use the quoted word *tab*:

```
getData("yetAnotherFile",1,"tab")
```

These will return, respectively, the text between the second and third commas in the file anotherFile and the text up to the first tab character in the file yetAnotherFile. When you adapt this method to the task of creating your own forms generator, you may need to experiment to make sure that your references are to the appropriate parts of the files. Fortunately, HyperCard displays the data in the item box immediately, so you can see right away if you're referring to the correct data.

As these examples imply, you can draw data from several different files and mix comma-delimited, tab-delimited, and standard text-file formats in one report, formatting items in any combination of fonts and styles. You can save many report formats in this one stack. And you can write your own functions, placing them in the stack script along with `getData` and invoking them in report-item contents just as you did with `getData`.

There is much room to extend this simple stack; for example, all the text in any one item will be assigned the same font and style. That may be appropriate for forms, but it is a limitation, and extending the stack to get around it is a puzzle. The puzzle is solvable (consider that a challenge).

HyperCard 2.0 has many welcome new features, some of which give users greater control over printing and over the user interface. I have written a stack that implements all the features discussed here and collects all the old and new printing capabilities of HyperCard on a new Print menu. The disk is available for $10 for parts and postage from the address below; it is also available for downloading from Zmac.

Michael Swaine covers HyperCard and other hyperstuff in *HyperPub*, a hypermedia journal published by The Prose Lab, 31 Patrick Road, Santa Cruz, CA 95060; (408) 459-8564.

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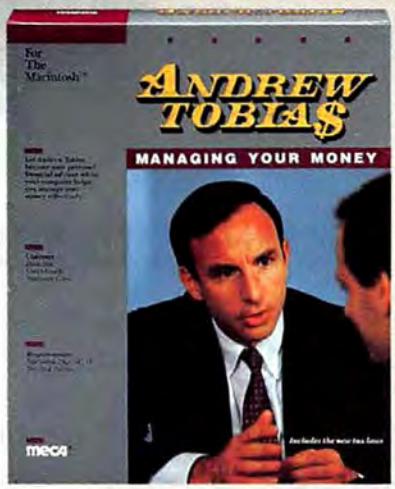

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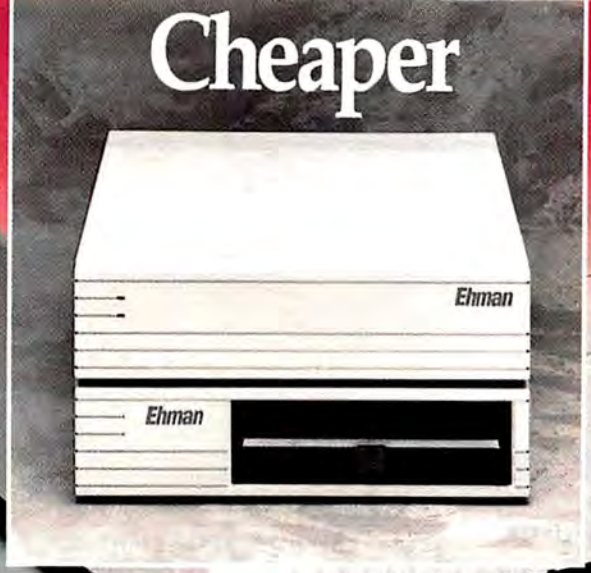

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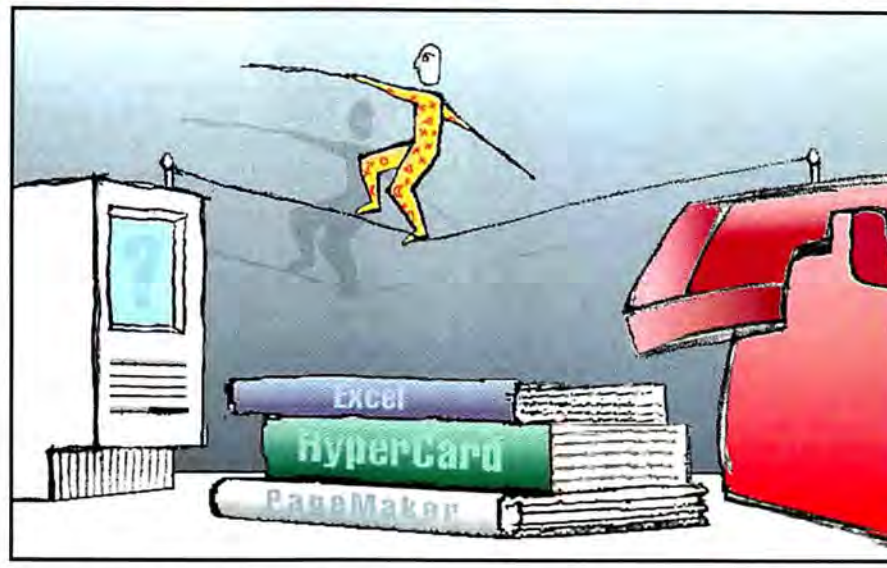
How to Get Tech Support

If you want good technical support, you've got to play by the rules. But that doesn't mean you can never get mad.

By Thom Hogan



Murphy's Law being what it is, I'd have to guess that every product that ships probably ships with a deficiency of some kind, whether the developer knows it or not. There are just too many hardware and software combinations and permutations for programmers and engineers to worry about these days, and occasionally a problem slips through. And, quite frankly, for small companies such as my own, there's just no way to test products on every machine, with every version of the System and with every combination of memory, INITs, and applications.

Of course, the question to you, the user, is What can you do when you encounter that problem? Call Technical Support. (As noted last month [page 263], Apple is an exception. Don't bother calling them — they're too busy reorganizing to answer your questions.)

Be Articulate

What happens when you call a company's support line? Well, it varies from company to company, but judging from my own experience and what I've gathered in talking to other support reps, the first problem that comes up in a support call is that callers aren't able to articulate clearly what their problems are. Most callers spend an inordinate amount of time with a preamble about how they acquired the product or a tirade expressing their dissatisfaction. All the person at the other end of the phone can do is listen until they finish and then ask the question: "What is your problem?"

Here's an example of what I'd like to hear when I pick up the support line at Macreations: "I double-clicked on your application's icon in MultiFinder, and the application appeared to start up, because I saw the menu bar change and your About Box appear. Then a box in the center of the display turned white, and I received the bomb alert with an ID number 25." This person has clearly articulated what he tried to do and what happened when he did it. I still need to get some other information from him, but I already know that I'm dealing with a fatal System-stopping-crash situation, that the user was paying close attention to what happened and is probably describing the events accurately, and that the problem can probably be repeated.

Here's what I usually hear: "Hi. I got your program through a special offer at last year's Macworld, and I finally got around to trying it out, and it doesn't run right. I know I haven't sent the registration card in yet, but I will if you can convince me that your program is going to be compatible with System 7.0 and can be run with a SideWinder 4-millimeter Floppy Tape Drive." This user has only told me that there is a problem, although how serious, I can't tell. Moreover, his casual approach to our product is a bad sign: Usually, when a customer starts out this way, I discover somewhere along the line that he hasn't bothered to read the manual's installation instructions and that he's making assumptions based on what he *wants* the software to do.

What the person in the technical-support

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hot seat wants to know when you call is the following:

1. An exact description of the events that triggered the problem, including any messages or special ID alerts you've seen.

2. The version number of the product you were using.

3. The version number of the System software you're using.

4. The Macintosh model you're using.

5. Whether you have any special, out-of-the-ordinary hardware attached to your system (double-page displays, accelerators, cache cards, and so on).

These five items can often narrow down the problem immediately. I've been able to answer about a quarter of the calls I've taken after obtaining just these five pieces of information. Most of the time, users are using an older System with a product that requires a newer one, but I don't want to overgeneralize here.

Read the Manual!

Assuming that those five easy pieces of data didn't narrow things down enough to solve your problem, things get nastier. First, I often make sure that the user did indeed read our documentation and follow the installation instructions. I recently had an irate caller complain about our "copy-protection scheme" on Tycho Table Maker. Well, we don't have one, so I knew something was amiss. After a few questions about how he installed the program, it became clear that the problem rested here. Had this user followed the instructions exactly, I wouldn't have had to answer the call.

Which brings me to an often-voiced complaint of customer-support folk: Users don't read manuals. I grimace every time I hear a support question starting with "How do I . . . ?" Either our manual is terrible (I'd rather not believe that — I wrote it!), or it went unread. Yes, I know that sometimes the index isn't as good as it could be, and sometimes we print things that are either too technical for lay users or too garbled for them to decipher. But more often than not, the question is "How do I insert a new row in a table?" Well, as both our index and table of contents reference this topic, I can't believe that this person really opened the manual.

Nevertheless, good customer support doesn't discriminate between readers and nonreaders — I answer the question good-naturedly and point out that more information on the subject can be found in the manual on pages 4-16 through 4-20.

Believe It or Not: True Customer-Support Stories

1. The user who, when asked to send a copy of his disk, put it into the photocopier.

2. The user who, when asked for the serial number of his disk, carefully snipped it off the label and mailed it in.

3. The user who forced a second disk into a drive that already contained a disk.

4. The user who typed R E T U R N instead of pressing the Return key.

5. The user whose mouse didn't work because it wasn't plugged in.

6. The user who complained that Microsoft Word 1.05 doesn't work too well with System 3.5 and Adobe Type Manager.

7. The user who set the Alarm Clock for 4 P.M. and then, at 4 P.M., called his dealer to find out what the flashing Apple was in the upper left corner of his display.

No *MacUser* reader would ever be caught doing any of these things, right? Right?

If you really can't find something in the manual, say so. "I'm trying to insert a new row in a table, but I can't find any reference to that in the manual's index or table of contents" is a perfectly valid question that tells me something I need to know: Users want to perform an action that I haven't indexed.

INIT Stew

Finally, we get to the real problems, the ones that are headaches for both you, the user, and me, the software producer. Problems that fall into this category include crashes that aren't repeatable, interaction effects that show up only in some products but not others, and performance problems. I know I'm going to get flack by stating this, but it's true: About 50 percent of the crash and interaction problems we get calls about are eventually traced to a particular INIT or cdev. Many of these clever little devices hook into the System (ROM routines, for example) and thus are effectively active all the time. Besides, neither Apple nor the INIT developers have done much to police their work and inform you of possible side effects.

Did you know, for instance, that there's a fixed limit on the number of files you can have open at once (I believe it's 40 in the current version of the System)? If you have 25 INITs running and they all keep one file open for some reason or another, what happens when you run five applications at once (each of which might have four documents open simultaneously) under MultiFinder? Guess what — you've exceeded a fixed limit, and strange things happen.

Likewise, INITs are supposed to automatically adjust the System-heap size when they load, but I've seen a few that don't. Others, including Apple's own Print Monitor, attempt to take memory away from running applications, if possible. Some have bugs that accidentally stomp on memory that's not their own.

In general, the more INITs and cdevs you run, the more likely you are to have problems running some programs. What's more, only some combinations of programs and INITs reveal the problem, while others merely conceal the bug that's always been lurking there, waiting to gobble you up. Simply changing the order in which some INITs load often changes the problem or makes it go away completely. Usually, the reason is that two or more INITs are trying to hook the same part of the System and that one or more of these are making assumptions they shouldn't.

Thus, once I've moved beyond the five basic questions with a caller, I inevitably ask this question: "Which INITs and cdevs are installed in your System?" What amazes me is how few users can answer it readily. Even if I can't remember which ones I'm using today, I can answer the question in a few seconds by pulling up the Control Panel and looking at the list InitPicker presents. You should be able to do this too. And if you have a product such as InitPicker (highly recommended), I can tell you which ones to remove to try to remedy the problem.

Where's Your Mac?

Which brings me to another point: You should be sitting at your Mac when you call. When I ask a user to try something and he responds, "Well, I'm at home right now, and my Mac is at the office," we come to an impasse. I can provide a list of things I'd like the user to try, but more often than not, I get another call later because the user didn't remember the list, wrote it down wrong, or hadn't clearly defined the problem in the previous call.

The nastiest problem calls I've had to handle take a great deal of detective work to solve. So please be patient. The answer isn't always obvious. For example, I've now run into several cases in which the whole problem was caused by events in the distant past: The user simply dragged the program's icons to the hard disk instead of using Apple's Installer to install a new System. Somewhere, somehow, some file didn't manage to get updated or was mismatched to the new System. This didn't cause any obvious damage, however, until a particular resource type was loaded in a particular way. Then bingo — all hell broke loose.

But let's face it, sometimes even the best customer-support personnel don't seem to comprehend your problem or they offer you a solution that seems arbitrary or asinine. ("I'm sorry, I can't send you a replacement disk unless you mail me five notarized statements, each of which must list your disk's serial number and be signed by either the dealer you bought the product from or the Pope.") So what do you do when you fail to get the support you require?

If All Else Fails

1. Get mad. Express your displeasure, but clearly state what it is that is angering you. (Don't say, "Why you insensitive little twerp," but try, "I am extremely dissatisfied with that response because I bought the product mail-order.") Be clear about what you want the support reps to do to solve your problem. If they respond that they have no authority to do that, go to the next step.

2. Ask to talk to a supervisor. If that fails, call the company's main number and ask to speak to the product manager for the program or hardware you're having problems with. These days, you're likely to get a voice-mail system, so be prepared with a concise (but firm) message saying you've tried to get help and haven't and that if you can't get your problem resolved satisfactorily, you will have to stop using the product and begin

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spreading the word to other Mac users.

3. Use your clout. If you work for a Fortune 500 company, try the phrase "I'm a high-level manager at a Fortune 500 company, and if this problem is not resolved satisfactorily, I will see to it that we don't order products from your company again and that your company president knows the reason we won't." If that doesn't send a chill down the support rep's spine, he or she is indeed spineless.

4. Go public. If you suscribe to CompuServe, ask for help there. Don't be afraid to explain the response you got from the company in question. More often than not, you'll get a response directly from someone at that company, especially if it is one of the larger ones. Good companies check the boards as much as they can, just to find out what users are saying about them behind their backs. Negative comments often draw positive results from the company.

5. Put it in writing. The number of calls some companies get a day is mind-boggling. And we sometimes just plain goof with our responses. It's a lot harder to goof when you're staring at a carefully reasoned, clearly stated letter that elaborates on a problem. Be sure to provide a phone number and the best time to reach you, as the easiest way to deal with problems is with a direct dialogue and phones promote that.

6. Ask for your money back. Many companies, including my own, offer a 30- or 60-day money-back guarantee. If you have a problem that can't be solved, most will extend that offer, if pushed hard enough. My former boss, Adam Osborne, had a simple way of dealing with customers who took this tack: He sent them a check with a letter that said, in effect, "Fine, here's your money back — please don't ever buy a product from our company again." He could do that with the knowledge that for customers to have come to his attention, they would have had to be passed upward by customer support, the customer-support management, the product managers, and probably a few executives too. And he knew that all of us were doing our best to solve the problem; therefore, the only way to solve it was to turn the customers into ex-customers. Frankly, I thought this was a cynical way of looking at customers, but if it gets you your money back, who are you to complain, right? Most of the industry will probably be more polite than this when they refund your purchase price — but you never know.

So there you have it. How to get good tech support. I'm sure I left out a few things, but I'm also sure that a few of you diligent types will let me know what I forgot. Only please don't phone me asking for customer support on this column. And please don't ask me to refund your subscription price. Let's see, to get your money back, you should call Jon Zilber, and his number is . . . .

Thom Hogan is president of Macreations when he isn't answering customer-support calls. From time to time, he has been known to make a few calls to other companies' support lines, just to see if anyone's really there.

How the left brain sees MacTools.®

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Data compression	✓		✓	✓			
Save file/folder selections	✓		✓	✓			
DATA RECOVERY	✓	✓					
Selective/intelligent search	✓						
Pause & view during undelete	✓						
Recover files in-place	✓						
OPTIMIZER	✓	✓			✓		
Visual display of fragmentation	✓				✓		
DATA PROTECTION	✓	✓					
FILE LOCATE	✓					✓	
HARD DISK PARTITIONING	✓	✓					
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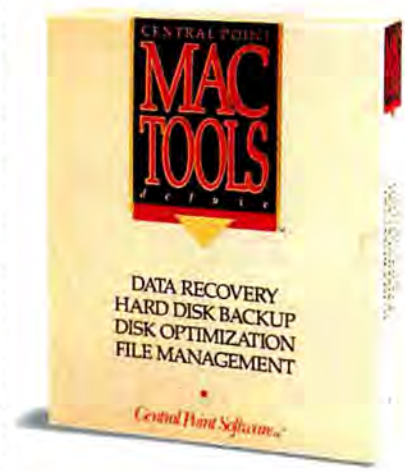

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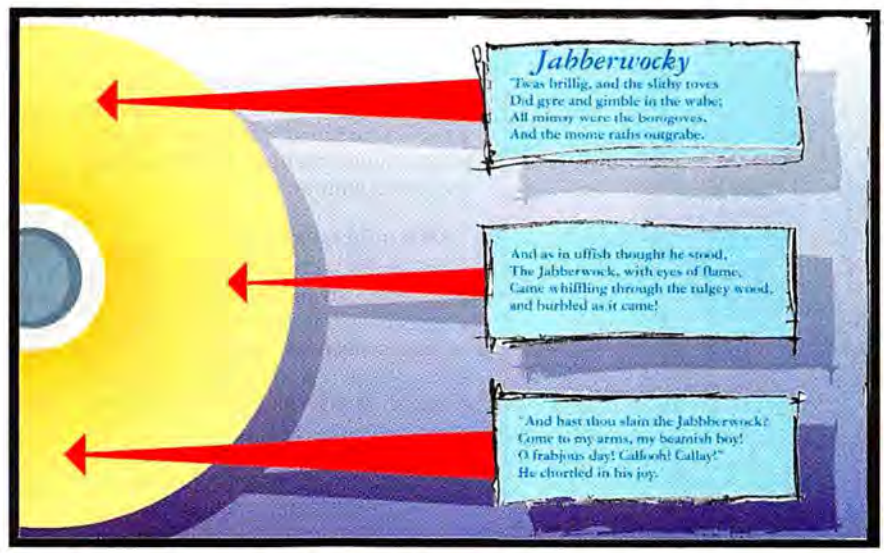
A File Browser: Part 1

Wouldn't it be useful to have a utility that could read any file — text or binary — and display its contents? Enter Browser, the Power Programming answer.

By Kurt W. G. Matthies and Thom Hogan



Last month we saw how the File Manager interacts with hardware at one end and programs at the other to create the illusion of the Macintosh's hierarchical file system. This month we'll put theory into practice and use the File Manager to open and read a file. The second half of the column is devoted to TextEdit, the Toolbox's built-in text engine. Put the two together, and you've got the beginnings of Browser, a utility that lets you immediately discern the contents of any file on your disk.

Opening Files

In September we saw how to use the Standard File Package routine **SFGetFile** to put up the standard file dialog box, which lets a user navigate the file system and select a file. When the user clicks on the Open button of this dialog box, **SFGetFile** fills an **SFReply** record with the name and volume number of the selected file, giving the information the program needs to open the file.

To open the file, you pass the filename and volume reference returned in the **SFReply** record to the high-level File Manager routine **FSOpen**. If the open is successful, **FSOpen** returns a result code of **noErr** and a file-access reference number in the **refNum** parameter. This number is used as the access path to the file and is valid until the file is closed or the program ends.

Browser uses the function **openFile()** in the source file FileUtil.c to open a file for reading. Browser passes **openFile()** a pointer to a **FileParams** structure, which it uses to keep all the data associated with the open file together.

openFile() performs four standard tasks. First, it sets the file's volume, returned by **SFGetFile**, to the current volume with **SetVol**. Next, it opens the file with **FSOpen**, after which it gets the file's size with **GetEOF** and stores the value in the **FileParam** structure. Finally, it sets the file mark to the beginning of the file with **FSSetFPos**. Example 1 contains the code for **openFile()**.

Error Handling

In Example 1, you see that **openFile()** calls **doFileCantAlert()** when an error is detected with a File Manager call. Checking the return value of File Manager calls is not just a good idea — it's the law.

File-system errors occur for various reasons: media errors, no more space, too many files open, errors in name or number, and a host of other problems. If you ignore these errors, you'll create a string of bugs that will eventually cause your program to crash. But if you program defensively, by checking a File Manager routine's result code, your program can notify the user of errors and back out of such problems gracefully.

The File Manager's functions return an **OSErr** value. These numeric values correspond to file-system errors, some of which we mentioned earlier. The result **noErr** is returned when things are OK, but a host of

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other `OSErr` results are possible when things go wrong.

Browser uses a standard set of functions (or error-translation utilities), declared in the source file FileErr.c, that deal with file-system errors. These functions translate a File Manager error number into a string, stored in a string-list resource (STR# 104), and print the string in an alert. `doFileCantAlert()` is the programming interface to these error-translation utilities.

Using ParamText

The `doFileCantAlert()` dialog box takes advantage of the Dialog Manager's parameter-text-substitution facilities, which you access through the `ParamText` routine. Say, for example, that a dialog box's text item contains one of the strings ^0, ^1, ^2, or ^3. `ParamText` specifies which of the strings ^0, ^1, ^2, or ^3 is to be substituted and what the substitution should be when the dialog box is displayed. `ParamText` is defined in Example 2; its arguments are string pointers to the strings that you want substituted. Figures 1 and 2 illustrate `ParamText` string substitution in the `doFileCantAlert()` dialog box.

`doFileCantAlert()` is displayed in Example 3. The arguments to this function are translated into the four `ParamText` values as follows:

- ^0 is the operation string. Passed as a token in the `whatOp` parameter, this string has five possible values that describe the five basic file operations: open, close, read, write, and control.
- ^1 substitutes the filename in question, passed in the first argument, `fileName`.
- ^2 is the error message. The error-translation utilities build this string from the function's `reason` argument, which can be either a File Manager error code or possibly an internal value — `doFileCantAlert()` calls `getIOErrStr()`, which creates a string from the error code.
- ^3 is any other descriptive string you choose to add, passed in the function's `infoStr` argument. For example, you could put the name of the calling function into this argument as a way of tracing program flow. If you don't want to use this argument, then pass the empty Pascal string pointer, `"\p"`. (Note: This is not the C nil pointer, `0L`.)

Reading the File

Reading can occur only after a file has been opened successfully and is a matter of transferring the contents of a file to

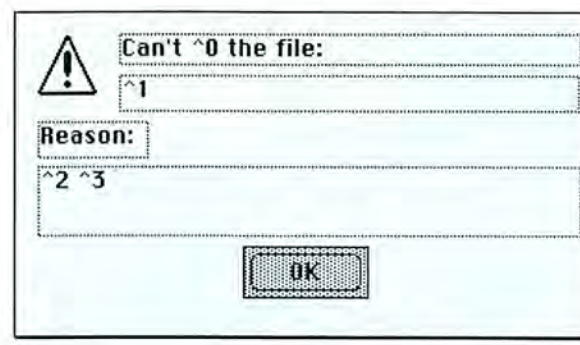

Figure 1: The `doFileCantAlert()` DITL uses the editText parameters ^0, ^1, ^2, and ^3.

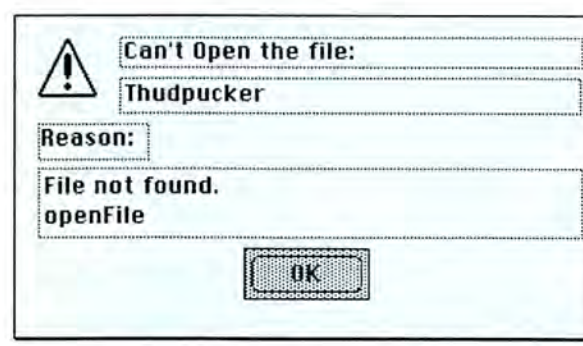

Figure 2: The same DITL after the parameters have been substituted

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memory with the File Manager routine **FSRead**.

Reading requires three items of information: from where, how much, and to where. To this end, **FSRead** accepts three arguments: the file reference number, a pointer to a long word with the number of bytes to read, and a pointer to the buffer where the read will place those bytes.

FSRead returns the number of bytes read in the same long word that held the requested amount. It's always possible that your program might reach the end of file and that the number of bytes read will be less than those requested. Example 4 contains a function that reads a file and detects a bad read or just an end of file.

On-Demand File Buffering

To solve a buffering boundary problem that occurs when the window contents comprise the bytes from more than one sector, Browser uses two file buffers for input. Figure 3 illustrates this double-buffered method of handling file input.

In addition to the file buffers, which are 16,384 bytes (16K) each, Browser uses memory to hold the page or two of the file that it's displaying. This memory is called the document-display buffer, and it is built according to the relative scroll position of the document — it changes when the user scrolls or resizes the window. Scrolling also causes the buffering mechanism to read more of the file into the file buffers. The source file BufMgr.c contains the routines that manage the file buffers.

The Display Modes

Browser displays text in two modes. Text mode simulates text-editor output (although no editing is possible). It is designed for files that have the TEXT signature, such as those created with the THINK C editor. Binary mode lets you look at anything else. We'll discuss binary mode next month.

Using TextEdit

The text display makes use of TextEdit, the Mac's built-in text manager. TextEdit revolves around **TERecord**, the TextEdit data structure that contains all data for the text cell. We had a brief encounter with TextEdit in the July '90 issue (page 238), where Generic App displayed the contents of a TEXT resource, using **TEUpdate** to draw the text. The creation process is similar in this situation, but this time we're getting

Example 1: `openFile()` from FileUtil.c

```
/* ------------------------------------------------
   openFile - open a file, get file size, seek to
beginning, return file reference number - 6.20.90kwgm
------------------------------------------------ */
OSErr
openFile (fileParams)
FileParamsPtr fileParams;
{
   OSErr        err;
   long         fSize;
   short        vRefNum;
   Str64        volName;

   /* set vol to passed value */
   if (err = SetVol (NIL, fileParams->volRefNum))
   {
      doFileCantAlert (fileParams->fileName,
                       kOpen, err,
                       kNulPascalStr);
      return (err);
   }

   /*  open the file */
   if (err = FSOpen (fileParams->fileName,
                     fileParams->volRefNum,
                     &fileParams->fileRefNum))

   {
      doFileCantAlert (fileParams->fileName,
                       kOpen, err,
                       kNulPascalStr);
      return (err);
   }

   /*  get the file size */
   if (err = GetEOF (fileParams->fileRefNum,
                     &fileParams->fileSize))
   {
      doFileCantAlert (fileParams->fileName,
                       kOpen, err,
                       kNulPascalStr);
      FSClose (fileParams->fileRefNum);
      return (err);
   }

   /* set the 'mark' to the beginning of the file */
   if (err = SetFPos (fileParams->fileRefNum,
                      fsFromStart, 0L))
   {
      doFileCantAlert (fileParams->fileName,
                       kOpen, err,
                       kNulPascalStr);
      FSClose (fileParams->fileRefNum);
       return (err);
   }

   return (noErr);

} /* openFile */
```


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Example 2: Declaration of `ParamText`

```
void
ParamText (s0, s1, s2, s3)
StringPtr s0, s1, s2, s3;
```

Example 3: Declaration of `doFileCantAlert()`

```
/* ------------------------------------------------
   doFileCantAlert - put up the can't open/close/read
   advisory and print other relevant information if
   supplied. Pass null pstrings for filename, infoStr
   if not used. - 5.28.90kwgm
------------------------------------------------  */
void
doFileCantAlert (fileName, whatOp, reason, infoStr)
   StringPtr   fileName, infoStr;
   short       whatOp, reason;
{
   DialogPtr   theDialog;
   Str255      errStr, whatStr;
   short       theItem, id, itemType;
   GrafPtr     savePort;
   Handle      buttonHdl;
   Rect        box;

   GetPort (&savePort);

   /* get the operation string */
   GetIndString (whatStr, kIOMsgStrID, whatOp);

   if (theDialog = GetNewDialog (kIOErrDLOG, 0L, -1L))
   {
      SysBeep (1);
      GetDItem (theDialog, kOutlineButton,
                &itemType, &buttonHdl, &box);
      SetDItem (theDialog, kOutlineButton,
                itemType, buttonProc, &box);

      /* build error string */
      getIOErrStr (errStr, reason);
      ParamText (whatStr, fileName, errStr, infoStr);
      centerWindow (theDialog);
      ShowHide (theDialog, true);

      ModalDialog (0L, &theItem);

      DisposDialog (theDialog);

   }

   SetPort (savePort);

} /* doFileCantAlert */
```

all of our data from a file.

A **`TERecord`** structure is allocated on the heap with the Toolbox call **`TENew`**, which creates the structure, initializes some of the fields, and returns a handle to the record. **`TENew`** accepts two arguments — a view-rectangle pointer and a destination-rectangle pointer.

The function in Example 5, **`makeTERec()`**, creates a **`TERecord`** structure that encompasses an entire window and that returns a handle to the record. **`makeFrameRect()`** creates a rectangle from the document's window, minus the scroll-bar areas.

The Text Selection Range

Using TextEdit routines, you can style, change, delete, or cut the text in a **`TERecord`** structure; copy it to the Clipboard; or perform other manipulations. Operations occur on the text selection range, which is controlled by two members of **`TERecord`**: **`selStart`** and **`selEnd`**. These values are specified as an offset into the text stream.

Consider the text in Figure 4, in which the word *time* is selected in the first line. The *t* in *time* begins at position 4, and consequently, **`selStart`** equals 4. The selection ends four characters after **`selStart`**, at the *e* in *time*, which makes **`selEnd`** equal 8. So to select the entire first line, you'd set **`selStart`** to 0 and **`selEnd`** to 35.

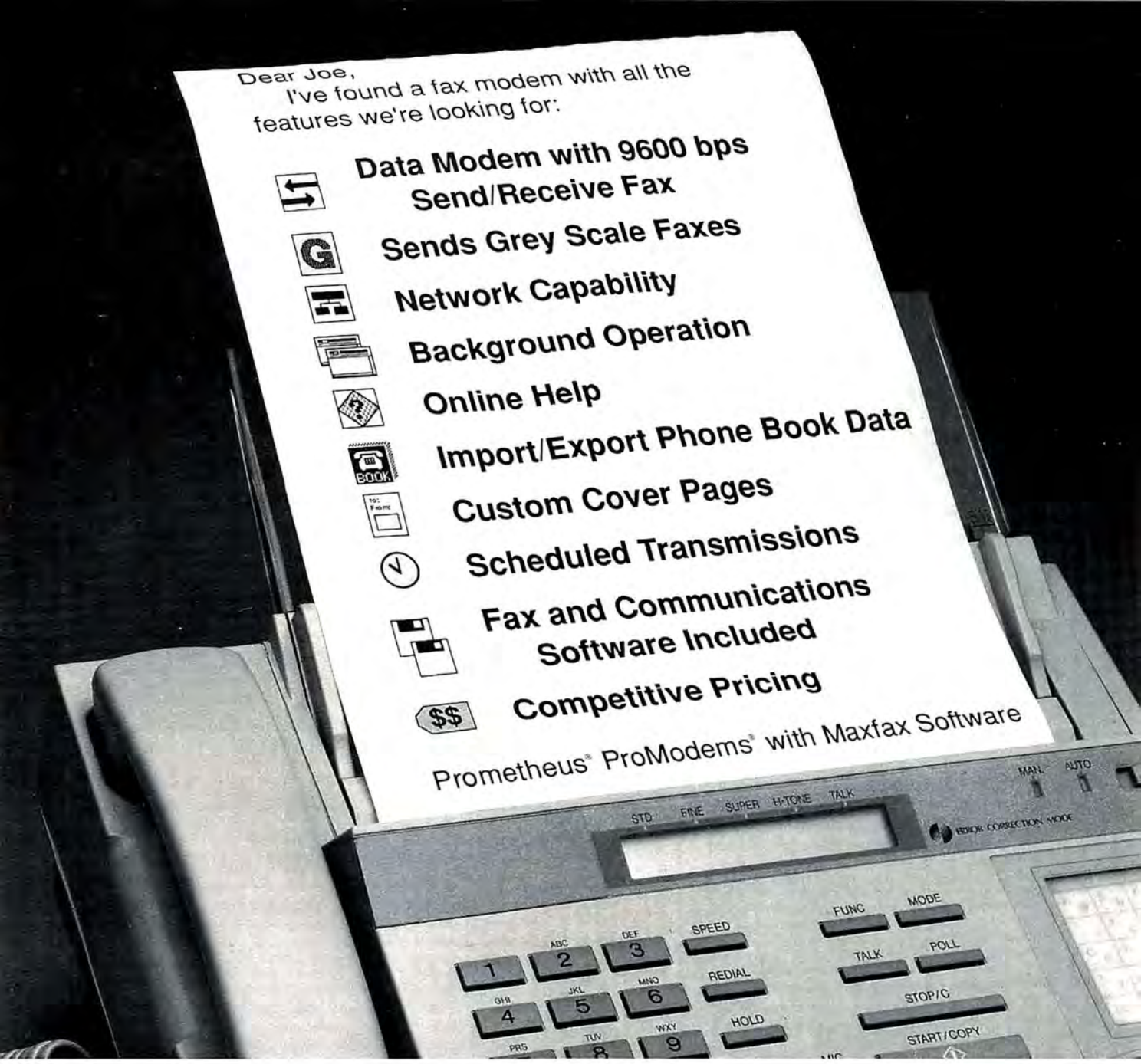
Text Styles

Prior to System 6.0, TextEdit supported only one font and style per **`TERecord`**. This kind of **`TERecord`** is created with **`TENew`**. You set font, face, and size specifications by directly writing the **`TERecord`** fields. For example, if you wanted 12-point Helvetica bold-italic text, you'd get it by calling something such as **`setStyleTE()`** in Example 6.

Since the advent of System 6.0, a new routine, **`TEStyleNew`**, has created the current variant of **`TERecord`** that supports multiple style runs. Because Browser uses the old version of **`TERecord`**, we'll save our discussion of this newer version of TextEdit for later.

The Text Buffer

TextEdit has a 32,767-character file-size limitation, which is built in to many factors of the **`TERecord`** structure, hence the use of the display buffer. Instead of limiting Browser to file sizes of less than 32K, we can coerce TextEdit to display a



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file of any size by managing the text in the **TERecord** buffer so it reflects only what's displayed.

Scrolling a Browser document consists of rebuilding the display buffer. Browser keeps track of certain anchoring values for the document — offsets of the first and last lines in the window and a file offset — and reacts to scroll commands by rebuilding the document-display buffer from the file buffers. Once Browser has created the new buffer, it instructs TextEdit to recalculate the **linestarts** array and redisplay the window.

Line Height

The **lineHeight** member of the **TERecord** structure contains the height of each line in pixels. Given the size of the document-frame rectangle, you can calculate how many lines of text will fit in the window. Browser needs to know this to do the scroll.

The linestarts Array

At the bottom of a **TERecord** structure is an extensible array of the offsets of the first character in each line of text, a function of the word-wrap. As an example, let's return to Lewis Carroll. Figure 5 illustrates the lines as they would appear on-screen and the corresponding **linestarts** array.

To demonstrate scrolling, let's say that the user pages down. Using the current line number of the last line in the window (which is the current **linestarts** position), Browser knows with just what character to begin the new top line. Using **BlockMove**, bytes starting at that offset are transferred from the file buffers (reading the file if necessary) into the new display buffer.

Browser next calls **TECalText** to rewrap the text and recalculate the **linestarts** values. After calculating the new last-line position, Browser calls **TEUpdate** to refresh the screen, which now contains new text.

Next Month

That's all we have room for this month. Next month Browser gets a binary interface, reads resource forks, and even adds a hierarchical menu or two.

You can download this month's source code (quickly) from Zmac, or those without a modem can get a disk (slowly) from me by sending a check for $15 made out to Kurt Matthies at P.O. Box 2233, El Granada, CA 94018.

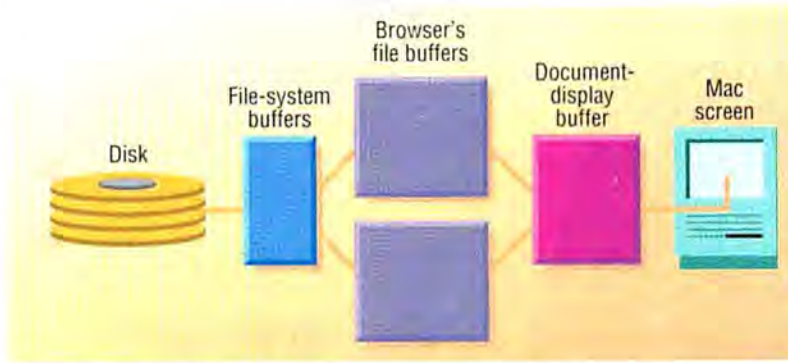

Figure 3: Using two buffers, Browser can create the display buffer from any combination of sectors.

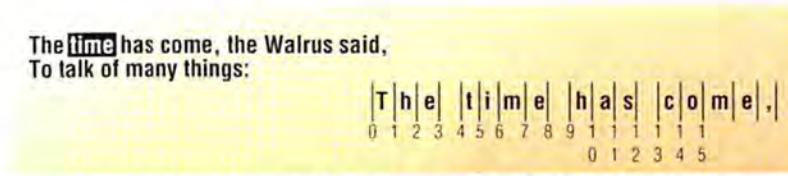

Figure 4: The word *time* is selected in the text run (top), but to TextEdit, the text is divided into character offsets (bottom) and the selection range is 4 to 8.

Example 4: Reading the File and Checking the Result

```
/* ------------------------------------------------------
   readBuf - read from file to local buffer - 7.20.90kwgm
------------------------------------------------------ */
readBuf (fileRef, len, buf)
   short fileRef;
   long *len;
   char *buf;
{
   long nRead;
   Boolean result;

   result = noErr;

   nRead = *len;
   if (err = FSRead (fileRef, len, buf))
   {
      if (err == eofErr)
            result = kEndOfFile;
   }
   else /* check that we read enuf */
   {
      if (nRead != *len)
            result = kEarlyEOF;
   }

   return (result);
}
```

0	'Twas brillig, and the slithy toves
36	Did gyre and gimble in the wabe;
69	All mimsy were the borogoves
98	And the mome raths outgrabe.

Figure 5: The `linestarts` array holds the offset of the first character for each line.

Example 5: Creating `TERecord` with `TENew`

```
TEHandle
makeTERec (DocPtr theDoc)
{
   TEHandle    teh;
   Rect viewRect, destRect;

   makeFrameRect (theDoc, &viewRect);
   destRect = viewRect;

   return (teh = TENew (&destRect, &viewRect));
}
```

Example 6: Setting the Style of a `TERecord` Created by `TENew`

```
#include <TextEdit.h>
#include <FontMgr.h>   /* for definition of helvetica */

TEHandle teh;

/* here we are in some function */
...
/* time to set the style */
setStyleTE (teh, helvetica, bold+italic, 12);

...
}

/* ------------------------------------------------------
   setStyleTE - set the font, face, and size of passed
   TERecHdl - 10,000 B.C. kwgm
------------------------------------------------------ */
void
setStyleTE (TEHandle teh, short font, Style face, short
   size)
{
   register TEPtr      tep;

   if (teh)    /* never hurts to check */
   {
      tep = *teh;    /* speed things up a bit */
      tep->txFont = font;
      tep->txSize = size;
      tep->txFace = face;
   }
}
```

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Compiled by Gregory Wasson

PowerMenus

Coach Pro and PowerMenus can't be used at the same time when they're set to defaults. If PowerMenus (an INIT) is loaded and you launch Coach Pro, the menu bar flickers.

You can circumvent this by going to the Control Panel and telling PowerMenus *not* to put PowerGadgets into the menu bar. When you want to use PowerGadgets, pop them up by using the alternative activation event that you've selected in the Control Panel (for example, Command-click and triple-click).

Glen S. Miranker
San Francisco, CA

4th Dimension

4th Dimension offers no quick, documented way to control the format of times, dates, or numbers in the QuickReport editor. You have to resort to formulas, which is more than many users are prepared to do. It is possible to format these items automatically, however. To format a time or date, you need only type the number of the format you desire into the detail area of the column in question. The different formats and their numbers are described on page 332 of the *Language Reference* and in the addendum to version 2.0.10.

Formatting a number is even more straightforward: Type the desired format in the detail section just as you would in the Design environment. For example, if you want to format an integer as a dollar amount, type $#,###.00 into the correct column.

[*4th Dimension also lets you type formatting numbers into the dialog box that pops up when you click on OK in the File menu's Page Setup box. — Ed.*]

David Adams
Aptos, CA

Tip of the Month

TeachText

Apple puts graphics into its Read Me TeachText documents, but how do those pretty pictures get there? The Paste command is disabled in TeachText when the Clipboard contains a picture, but you can use ResEdit to work around this. Here's how to do it:

1. Type the text of your TeachText document, using hard returns to leave space for the graphics.

2. Type an Option-space on the line where you want each picture to start. The picture will begin at the Option-space line and extend downward.

3. Save and close your TeachText document.

4. Paste the pictures you want to use into the Scrapbook.

5. Start ResEdit, and open your TeachText document. Answer OK when asked if you want to create a resource fork.

6. When an empty window appears, copy and paste each of the pictures you want to use from the Scrapbook to the window. You won't see the pictures as you paste them into the ResEdit window; instead, the word *PICT* appears.

7. Select the word *PICT* and choose Open General from the ResEdit File menu, which produces a list of PICT resources with IDs. Select these individual items one by one, and choose Get Info from the File menu (Command-I).

8. Change the first PICT's resource ID number to 1000, the second PICT's resource ID number to 1001, and so on for all your pictures (see Figure 1).

Figure 1: A little resource editing, as shown here, makes it possible for anyone to import pictures from the Clipboard into a TeachText file.

9. Quit ResEdit, and save your changes when prompted to do so.

When you open your document in TeachText, each picture appears centered horizontally. Your first picture (PICT ID 1000) begins on the line with the first Option-space, the next picture begins on the line with the next Option-space, and so on. The pictures will be superimposed over any text that happens to be there, so be sure to type enough returns to ensure that the text is not obscured.

You can make the document read-only by changing the file type from TEXT to ttro, which stands for TeachText read only.

Colin Bay
Portland, OR

FileMaker II

Have you ever wanted to select a group of records in FileMaker II that have no field in common (for example, the 23 people who lost last month's report)? Create a special "select" box on your layout — a field in a box to make it easy to find.

To use the select box, issue the Find command to locate each individual record, and then enter *X* in the select box. Use the Find All command and then the Find command to locate the checked boxes. The whole group is selected, and you can mail-merge or sort the results. You can sort records into several groups by entering different characters into the select box and then using the Find command to select each subgroup.

To deselect the records, highlight the select field, press Delete, and then press Command-= to clear all the boxes.

Robyn Whitehood
Sydney, Australia

Panorama 1.5A

When you create a data-entry form, Panorama lets you assign field names through a pop-up menu. This is a problem if you're creating a database with more than 256 fields, because the menu handler can handle only 256 menu items. If there are more than 256, the pop-up menu won't scroll properly. When it scrolls, it won't draw the new menu choices. The highlight for the menu often won't show at all.

Here's a workaround for assigning field names to the nonexistent menu choices:

1. Duplicate the last field created. Put the duplicate into the desired location, size it, and assign a font if you want a different one.

2. Choose the field-edit/create tool. Hold the mouse button down over your newly created field. Panorama's pop-up menu appears, with the name of that field directly under the pointer. Several column names appear below the current name, depending on how much room there is on your screen. Now choose the column name you want to use for this field name.

David D. Good
Melbourne Beach, FL

Layout

Layout (a freeware program by Michael C. O'Connor) is a convenient tool for changing the way the Finder displays its various views. I use it to stagger icons in Finder's icon view, preventing the names from overlapping the icons. Unfortunately, Layout uses the rather short name "Document" for the samples that you drag on the screen to set the grid spacing and offset. The Finder allows names of up to 31 characters, so some trial and error is necessary to achieve the best spacing for the name lengths you typically use.

The name Layout uses in adjusting spacing is stored in the STR resource "DocT" (ID = 328). To eliminate the trial-and-error approach, employ ResEdit to modify this resource, which originally contains the string "Document". Replacing this string with "Document name with max 31 chars" (Figure 2) lets you space the icons to accommodate the longest names Finder lets you use.

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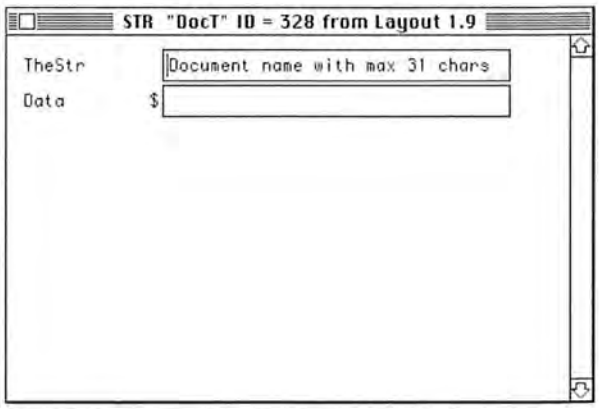

Figure 2: You can customize the freeware program Layout to provide more spacious spacing of icons in the Finder's View by Icon mode by using ResEdit to modify an STR resource.

Of course, you can enter any other string here to represent the maximum length of names you normally use. As always when modifying applications with ResEdit, be careful to make your changes on a copy of Layout, not on the original.

[Layout is available in the Download Library Forum on Zmac. — Ed.]

Steve Harmony
Los Alamos, NM

Read MacWrite

Many software developers continue to use MacWrite format as their standard for on-disk program documentation. This can be inconvenient if you don't have MacWrite. You have to open up Microsoft Word or some other word processor and import the file, even if all you want to do is take a peek at the documentation.

In the April '90 Tip Sheet (page 259), Hari Wiguna suggested modifying Word's Creator to MACA, using ResEdit. However, if you're not comfortable with ResEdit or if text files are what you're after, there's a nice shareware utility, Read MacWrite, that opens MacWrite files and scrolls through them on the screen while saving the contents as a plain text file. Now if you need to take a look at some documentation on the fly, you can just open the file with a DA such as miniWRITER (which is also shareware).

You can pause the scrolling, but Read MacWrite lacks a text buffer and elevator boxes for scrolling back over what you've read. Once the text has scrolled by, it's gone until you reopen the file and start at the beginning.

Read MacWrite's quick production of text files from MacWrite-formatted documents would also come in handy if you had several MacWrite files that you needed to get into plain-text format in a hurry.

[Read MacWrite is available in the Download Library Forum on Zmac. — Ed.]

Christopher Dwyer
Philadelphia, PA

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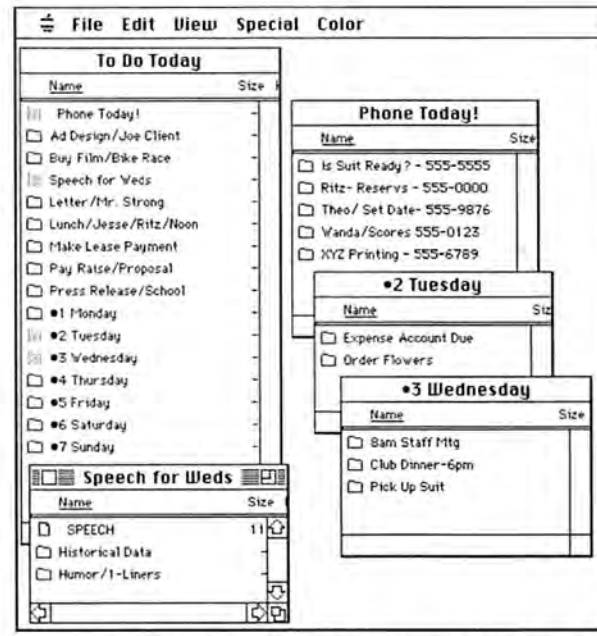


Figure 3: You can create an effective appointment or reminder list by using the Finder's hierarchical filing system. Dummy folders contain other folders with appropriate mnemonic filenames.

Finder

This tip provides a quick and easy To-Do List function for the Finder. I've tried other list generators, outliners, and organizers — both applications and DAs — but in most cases you have to open the program or the DA to look at your list. Although a program such as Smart Alarms solves that problem for a certain price — in money, INIT conflicts, and memory — here's a free and easy way to keep organized lists on your desktop.

Press Command-N to get a new folder. Then, in 31 characters or fewer, enter a brief description of your memo. Do this for each item on your list. Drag these folders onto the desktop, where they're constantly under your nose as a reminder of some important activity or event. Or you can neatly arrange these folders inside other folders appropriately entitled To Do Today, Letters, Appointments, and so on (see Figure 3). You can easily create, trash, rearrange, and modify these folders as needed. They're also useful as repositories of further information on a particular project.

Christopher Cross
Allentown, PA

When you eject a selected floppy disk using the keyboard shortcut Command-E, a ghosted image of the floppy remains on the desktop and your Mac can demand that you insert the floppy when you least want to. To keep that from happening, press Option-Command-E when you want to eject a disk. You can use the Option key for the same purpose when you click on the Eject button in the standard Open dialog box — Option-click on that button to ensure that the Mac doesn't pester you again for that floppy during your work session.

Eric Apgar
New Haven, CT

Canvas 2.1

You may have learned the hard way that object-type artwork that is stored in a HyperCard clip-art file loses its high

resolution and becomes 72 dpi. So how can you store large amounts of object-oriented clip art in an organized manner? Canvas 2.1 provides a simple but elegant solution:

1. Create a new document, and give it a descriptive name, such as Business Images. Then begin pasting in the graphic objects, arranging them on the page.

2. Use the scroll bars or magnification tool to center one of the objects on your screen.

3. Choose the New View command from the Layout menu, and give the view of the centered graphic a descriptive name such as Bottle Message. Click on OK. Repeat this step for every graphic on the page.

Now whenever you drag your cursor down to the Views command on the Layout menu, the hierarchical pop-up menu includes the names you have given to these views, allowing you to jump quickly to any graphic on the page, modify it if desired, and copy it to the Clipboard.

Marc Knoedler
Vassar, MI

WriteNow 2.2

WriteNow 2.2 does not automatically generate endnotes, but you can use the footnote feature and some editing to generate them.

Create the document as you normally would, inserting footnotes into the text as needed. (They'll appear at the bottom of the page.) When the document is finished, create endnotes as follows:

1. Choose Show Markers (Command-Y) from the View menu.

2. Choose Footnote View (Command-K) from the View menu.

3. Choose Select All (Command-A) from the Edit menu, and then choose Copy (Command-C).

4. Choose Page View (Command-D) from the View menu. Go to the end of the document, and click to place the insertion point.

5. Choose the Insert Page Break command (Command-Shift-B) from the Format menu. Type the word *Endnotes* (or whatever you want), and press Return.

6. Use the Paste command (Command-V) to place the footnotes at the end of the document. The footnotes are unnumbered, but there's a footnote marker at the beginning of each note.

7. Now go to the beginning of the document, and click to place the insertion point.

8. Choose Footnote View, or press Command-K.

9. Choose Page View (Command-D). The insertion point will now be after the first footnote marker.

10. Press the Delete key to delete the marker.

11. Type Command-H (Superscript style) and then the endnote number.

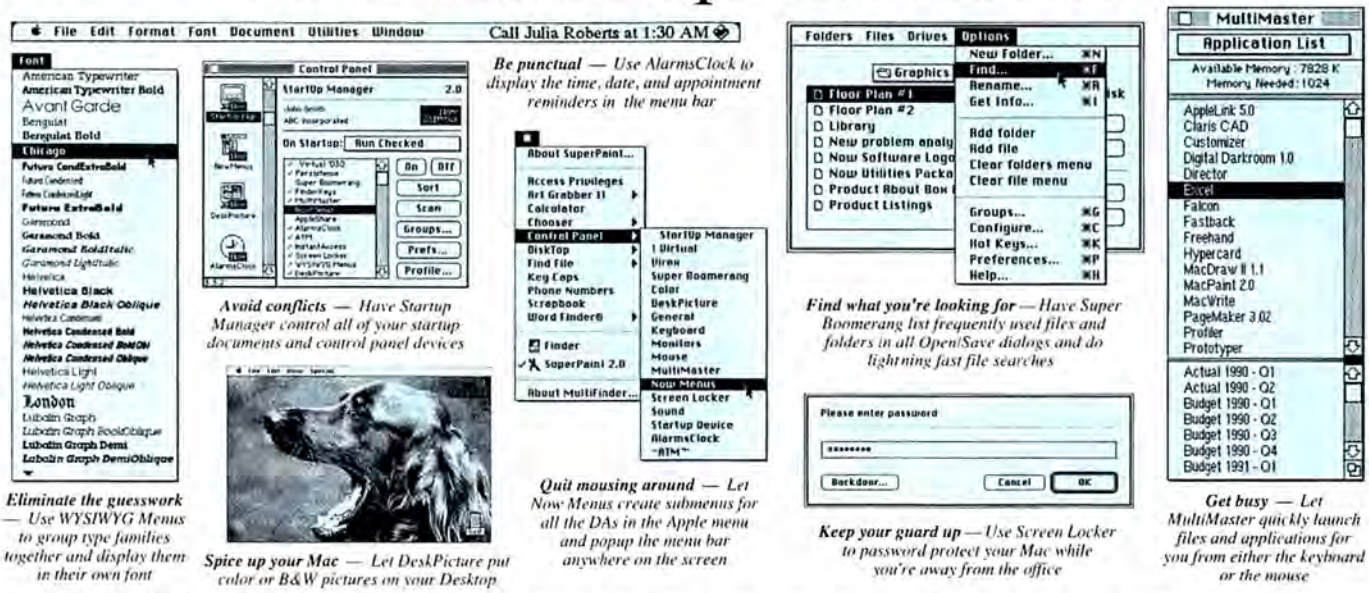
Repeat steps 8 through 11 until you've finished numbering all the notes in the text.

12. Number all the actual endnotes at the end of the document.

You can create a macro to do much of this for you. Just have the macro stop after step 11. Then simply run the macro and type the note numbers.

John P. Walsh
Pittsburgh, PA

Hard disk utilities give you SUM of what you need, Now Utilities 2.0 provides the rest.



Products like SUM let you get the most out of your hard disk. Now Utilities lets you get the most out of your software. As *MacWorld* put it, "This collection of 12 programs really does have something for everyone." In addition to everything pictured above, Now Utilities 2.0 includes two Finder enhancement utilities, a facility for previewing documents before you print them, and a system profiler. In short, it gives you everything you need to get the most out of your Macintosh...in one box, with everything guaranteed to work together, for only ***$129***. The result? According to *MacUser* , "you'll become more productive and probably have more fun." And isn't that why you bought a Mac in the first place? Call us toll-free at ***1-800-237-3611*** to learn more about what Now Utilities 2.0 can do for you.

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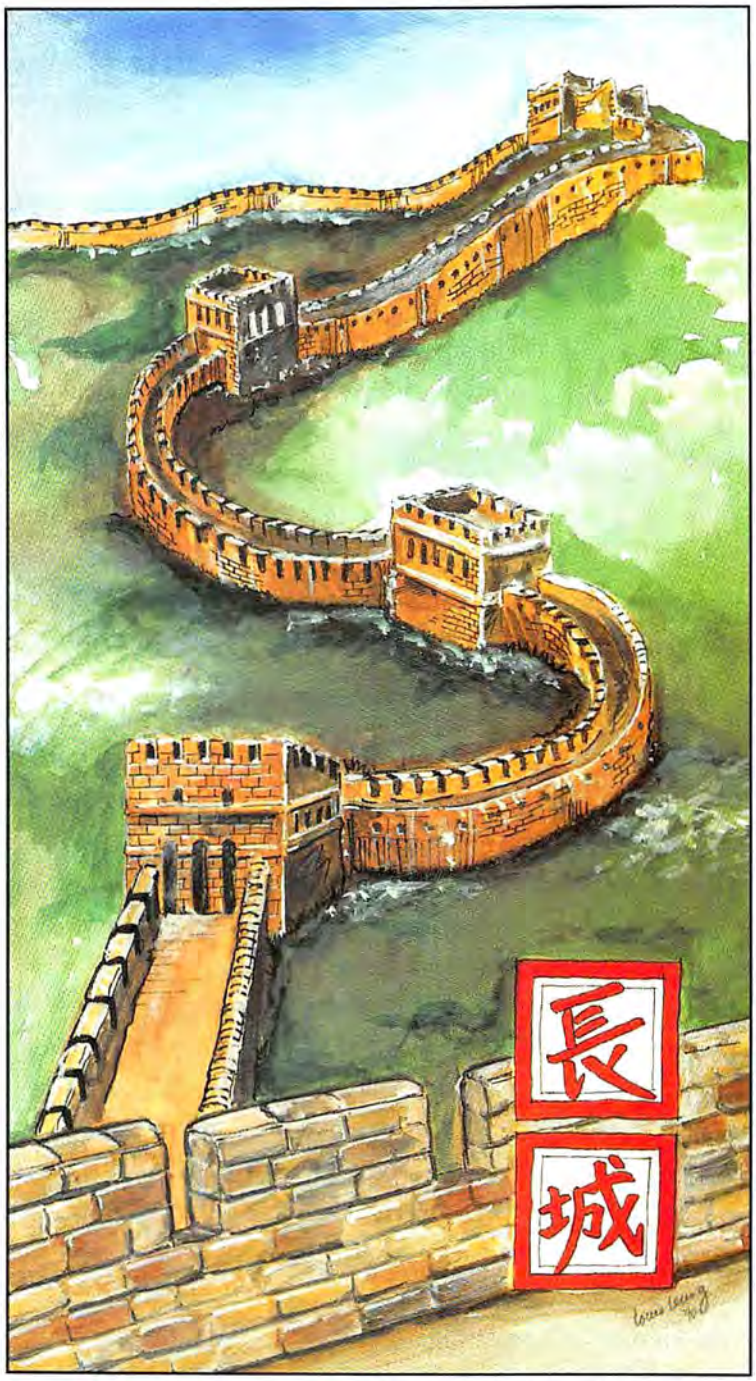

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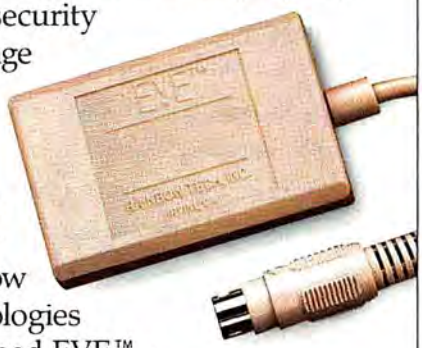

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HELP FOLDER

Is your Mac sick? Need a diagnosis? Leave it to the doctor — Bob LeVitus. He's the author of Dr. Macintosh: Tips, Techniques and Advice on Mastering the Macintosh *and the former editor-in-chief of* MACazine. *He's also the guy who answers your questions in this space every month.*

✉ *Write to Help Folder, c/o* MacUser, *950 Tower Lane, 18th Floor, Foster City, CA 94404.*

By Bob LeVitus

Printing PostScript to Disk Again

Last April (page 262), I described the method for printing a PostScript file to disk: Hold down the Command and K keys immediately after clicking on the OK button in the Print dialog box. This approach works, unless, as Luc Dubois, writing from Belgium, pointed out, you're using MultiFinder and have Background Printing enabled. If this is the case, your PostScript file will never be printed to disk.

If you normally use both MultiFinder and Background Printing, don't despair — you can still print a PostScript file to disk. Here's what you need to do:

1. *Open the Chooser DA.*
2. *Select your laser printer.*
3. *Turn Background Printing off.*
4. *Close the Chooser.*

Now, if you hold down the Command and K keys immediately after you click on OK in the Print dialog box, you'll see a box that says, "Now printing PostScript file." Don't forget to turn Background Printing back on when you've finished.

Make Your Own Dictionaries

In August '90 (page 283), I reported that Microsoft had told me that the tools to build a foreign-language (Tok Pisin, the language spoken in New Guinea) dictionary cost $25,000. One of our resourceful readers, Tom Petaccia of Charlotte, North Carolina, contacted me electronically via Zmac, the on-line companion to MacUser. *He described a method you can use to make your own Word dictionaries:*

"All you need to do is open a new Word document and start typing your dictionary (one word per line). Then do a Sort (not necessary, but a good idea to get things in some kind of order), and save the document as Text Only. Then, using DiskTop, ResEdit, or a similar utility, change the file TYPE from TEXT to DICT.

"You can indeed have more than one dictionary open. Select Spelling from the Utilities menu (or press Command-L), and get the Start Check dialog box; then choose Open from the File menu (or press Command-O). You can then open the new dictionary plus any other DICT file you desire.

"This step lets you add new words to your new DICT by using the Add feature; or if you want to do a batch add, you can reverse the process — that is, change the file TYPE to TEXT, add/edit, and then change back to DICT."

Tom's technique seems to work, and it sure doesn't cost $25,000 — it's certainly worth a shot.

Preserving Get Info Comments

Susan Rollinson of Clifton Forge, Virginia, writes, "I decided to see if something else could be done about preserving Get Info comments when you rebuild the desktop (Help Folder, March '90, page 231). Snooping through the Desktop file with ResEdit, I came upon the following solution:

"Finder comments are stored in FCMT resources in the Desktop file. If you store these comments in a separate file before rebuilding your desktop, they can be restored afterward. I use ResEdit to perform the surgery. Make sure you're running under the Finder, not MultiFinder: MultiFinder keeps the Desktop file open and not accessible to ResEdit. Launch ResEdit, and create a new file — I call mine FComments. Now open the Desktop file of the disk you want to rebuild. Copy the FCMT resources from the Desktop file to the FComments file. Save the FComments file, and quit ResEdit. Rebuild the desktop. Return to ResEdit, and copy the resources from the FComments file back into the desktop you copied them from. Save the desktop, and then quit ResEdit. Check the Get Info boxes when you get back to the Finder. Your comments have been restored."

It works. Thanks, Susan.

Another Way to Rebuild the Desktop, or What?

Q. Frequently, as in the June '90 issue (Tip Sheet, page 293), someone recommends rebuilding the Mac's Desktop file. The method described for accomplishing this always includes rebooting the computer. I get the same dialog box by holding down the Command and Option keys while closing any application. Am I accomplishing the identical goal, or am I wasting my time and possibly damaging my machine?

Michael Garvey
Laguna Niguel, CA

A. *Yes, you're doing the right thing. Holding down the Command and Option keys when you quit an application produces the same dialog box and desktop-rebuilding procedure as holding down these keys when you restart your computer. The net effect — rebuilding the desktop — is exactly the same.*

By the way, this technique works under the Finder only. If you're using MultiFinder, holding down the Command and Option keys when you quit an application does nothing. You have to rebuild your desktop by restarting your Mac as described above.

On or Off?

Q. My computer at home is a Mac SE with an internal 20-megabyte hard-disk drive and

an 800K floppy-disk drive. It's used almost daily.

My question: Is it better to leave the machine running constantly or to turn it on and off daily?

William Brunko
Chehalis, WA

A. *This has to be one of the most debated topics in computing history. I thought I could settle it once and for all by getting Apple's official position, for the record.*

Ha. An Apple spokesman told me that Apple has no official position. He said, more or less, that if you ask three different people, you will get three different answers.

Next I turned to a public forum — the Editor's On-Line area of the MacUser Forum on Zmac. I posed the question to the experts who frequent Zmac. As I expected, there were conflicting opinions; there seemed to be two main schools of thought:

Method 1: Turn the computer on in the morning and off at night.

Pros: Saves power. Less wear on hard disk.

Cons: Possibility of increasing stress on solder and electronics from heating and cooling, and creating more stress on hard disk from powering up and shutting down.

Method 2: Never turn it off unless you plan not to use it for several days. (Option: Turn off monitor at night.)

Pros: Reduces stress on solder and electronics from heating and cooling.

Cons: Hard disk spins all night, causing more wear than if it were shut down.

MacUser Labs director Andrew Eisner said, "My vote is for energy conservation. Thermal stress is probably pretty negligible with today's manufacturing techniques and solid-state circuitry. Just think of the millions of watts of wasted power if everyone left their computers running all the time."

User Jonathan A. Oski countered with "At my office, most people leave their computers on all day. Our network servers are up all the time. Some servers have been on for two to three years without any failures."

Contributing MacUser *business editor Robert Wiggins chimed in with "Just be consistent. If you leave it on, leave it on. Once it's left on for long periods, switching to on/off will multiply the stresses. If it gets used to on/off, leaving it on can lead to thermal problems. So pick the method that works for you, and stick with it."*

I'm with Jonathan. I leave my Mac on all the time, sometimes for months on end. I shut it down only when I'll be away for a couple of days or more. But I have good reason. I set Retrospect (the ace archiving utility from Dantz Development) and CompuServe Navigator to run automatically at 4 A.M. and 5 A.M., respectively. So my hard-disk drive is archived and backed up, and my electronic mail is retrieved while I'm still in bed. That alone is reason enough for me to leave things running all the time.

Furthermore, I also believe that running your Mac all the time is less stressful

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to components than turning everything on and off a lot, especially if your pattern of usage is like mine, in which case your Mac might be used at any time of day or night.

You should use whichever method sounds best to you, and rest assured that there is an expert out there who thinks that's the best method too.

Slow Scrolling

Q. I recently installed an accelerator in my SE, but now my scroll bars are working at warp speed. When I click on the scroll arrows, instead of the normal single-line advancement, I get 10 to 15 lines flashing by. Is there any way to slow down the scroll bars without sacrificing any other speed?

Scott Junk
Costa Mesa, CA

A. *Good news, Scott. There's a little cdev called Scroll Limit that does just what you ask (see Figure 1). This is one of those utilities that's so useful you wonder why it isn't bundled with all accelerators.*

Scroll Limit is a freeware program, available from Zmac and other shareware sources.

The Interrupt Switch

Q. I would like to know which programming environment I'm in after pressing the interrupt switch. What is it possible to do in the open window, and where can I find information on these possibilities?

Pierre Narvor
Nantes, France

A. *Tom Chavez, one of the wizards in the Apple Developer Relations organization, says, "When a user presses the interrupt key, the machine enters a very simple debugger. In it, you can type G for Go, SM for Set Memory, and a few other commands.*

A real debugger for the Mac, MacsBug, is available from Developer Tools Express for $35. It's a complete, fully featured debugger with breakpoints, tracing, and so on."

Here's my *trick for using the interrupt switch: If you've crashed or the cursor is frozen, press the interrupt switch and then type* **G FINDER** *at the* **>** *prompt (see Figure 2). Leave a space after the* **G**, *and type a carriage return after the* **R**. *If the crash wasn't too severe, you'll be returned*

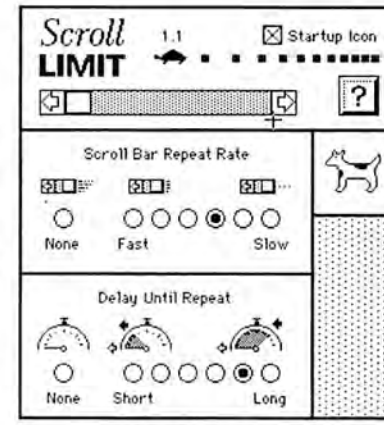

Figure 1: The Scroll Limit cdev slows down scroll bars — a must-have for fast or accelerated Macs.

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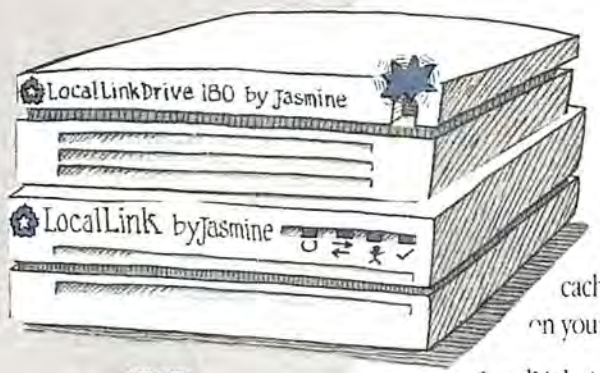

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```
>G FINDER
```

Figure 2: You can often return safely to the Finder after you've crashed, by pressing the Interrupt key and then typing these words. Don't forget to press Return afterward.

to the Finder, where you can use the Restart or Shut Down commands to close things up tidily. You'll probably see a message telling you that the application you were working in has "unexpectedly quit." That's OK. Even though you'll probably lose any work you've done since your last Save, chances are your file won't be damaged.

DTE (Developer Tools Express) is a new service from Apple, designed for programmers new to Apple development. DTE lets you buy fully tested and completely documented Apple programming products directly, with no annual fee and no organizations to join. MacsBug is available from it for $35. You can contact DTE at (800) 282-2732 (in the U.S.) or (408) 562-3910 (internationally).

Unreadable Disks

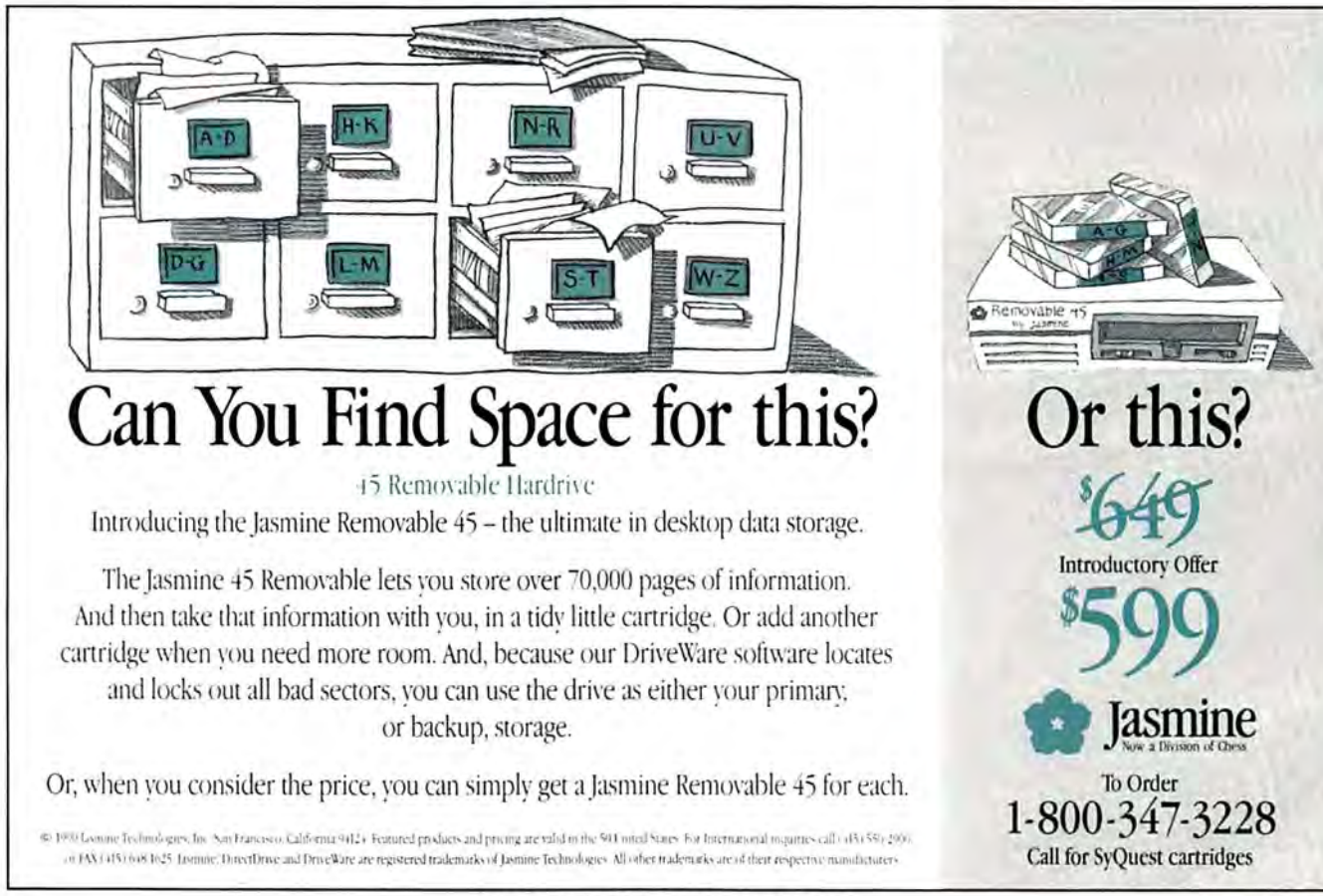
Q. You are my last resort before going to an Apple dealer. My system is an SE with two floppy-disk drives and an external hard-disk drive. The lower floppy-disk drive has an intermittent problem. Sometimes when I put a disk in, it works fine. At other times, I get this message, "This disk is unreadable: Do you want to initialize it?" I know that these disks are good, because I use them in the other drive and they work. Sometimes I take a perfectly good disk, put it in, and get the "Disk unreadable" message — and then, no matter what I do, I can't get the disk to work in any drive. I've lost many files because of this. Currently I just avoid using that drive.

The reason I don't want to go to the Apple dealer is that as I cannot reliably duplicate the problem for the staff, I'm sure they'll tell me they can't fix what's not broken.

Neil Luckner
Brooklyn, NY

A. *That hasn't been my experience. Chances are an Apple dealer would listen to your story and then tell you that the floppy-disk drive has problems and needs to be repaired or replaced. And I bet the dealer would be right.*

The behavior you describe is the behavior of a very sick drive. I suggest you see a dealer immediately.



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Ralph Owen, President, MacFriends

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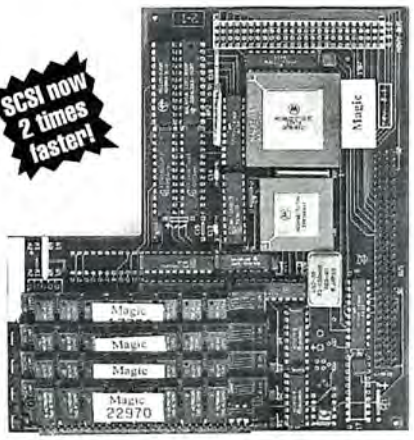

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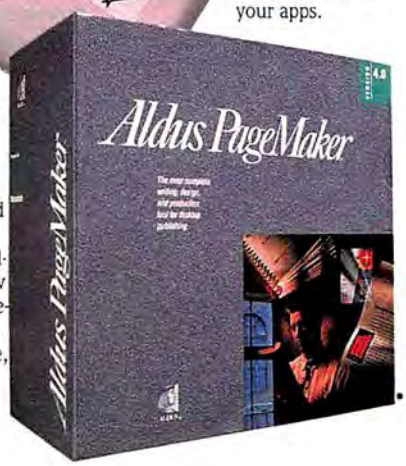

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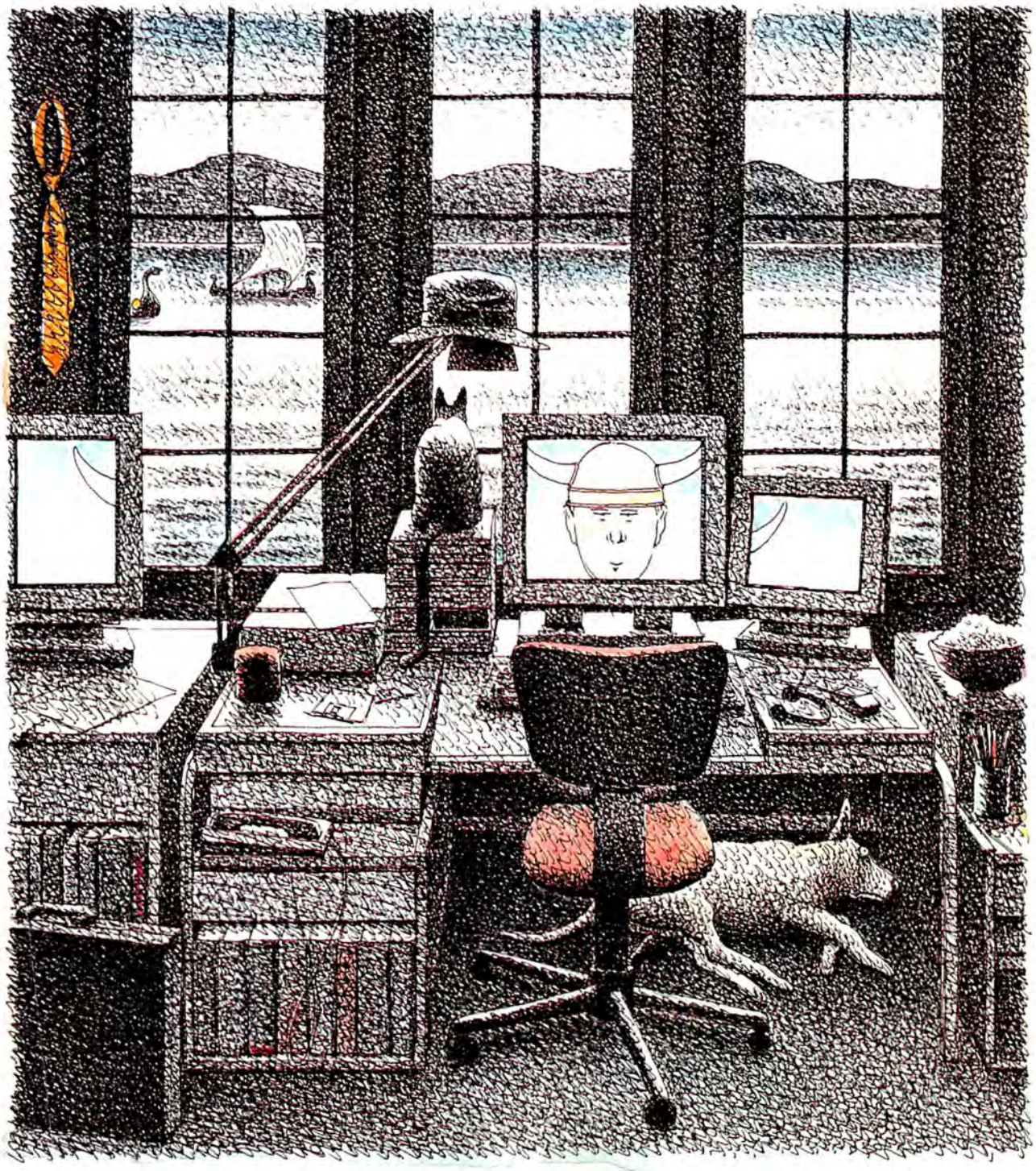

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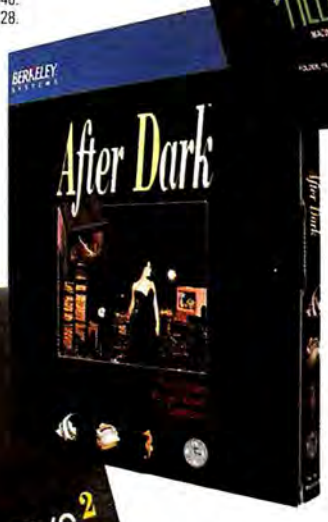

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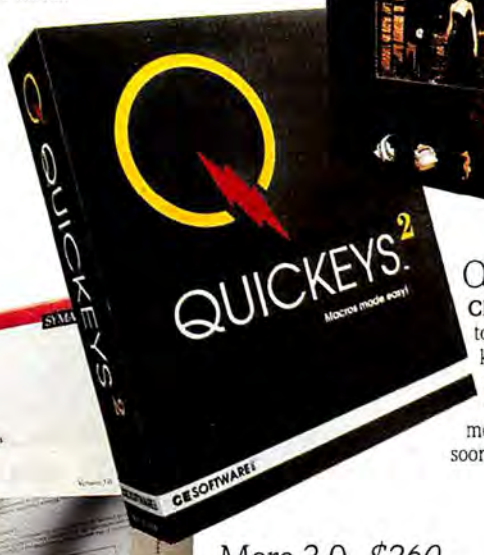

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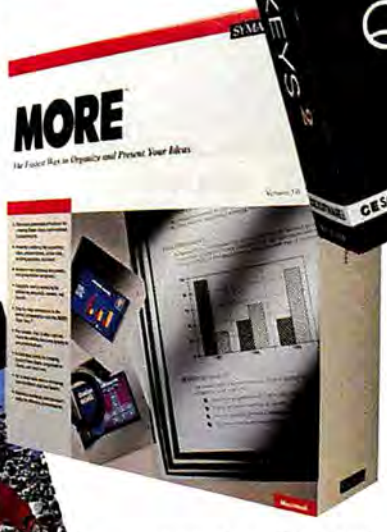

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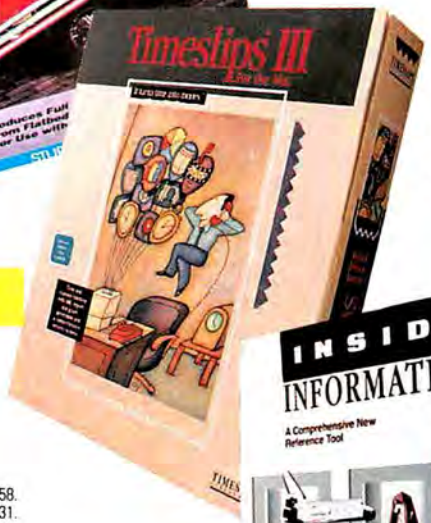

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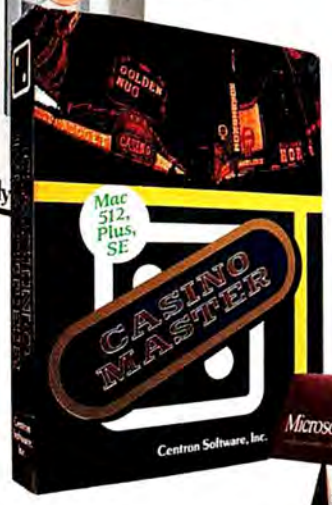

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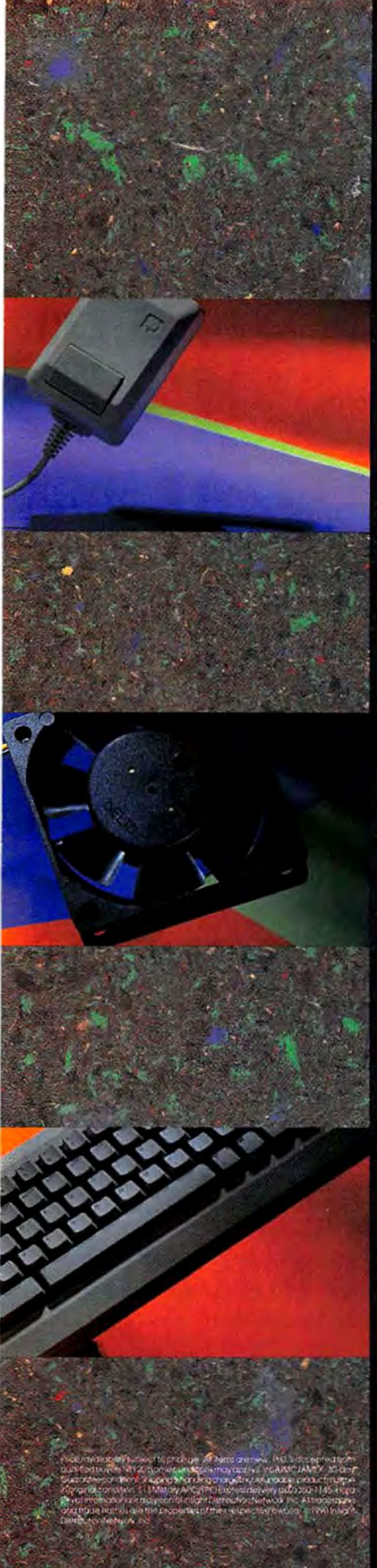

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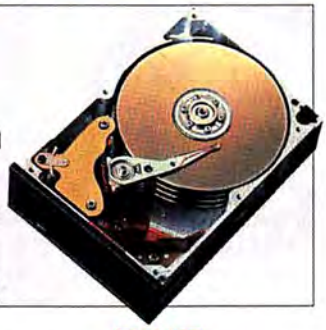

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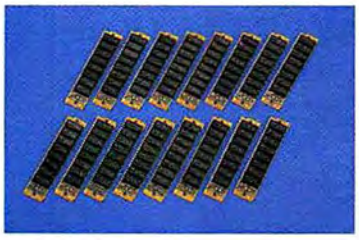

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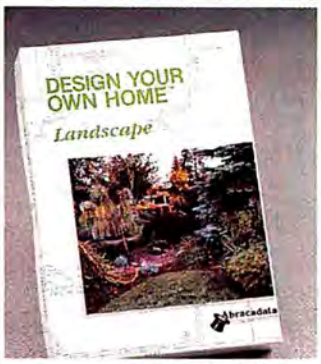

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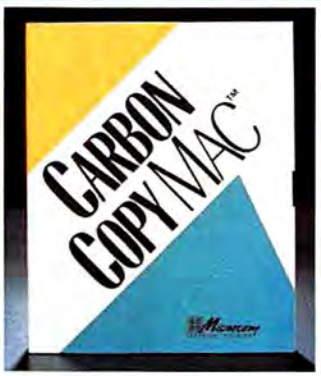

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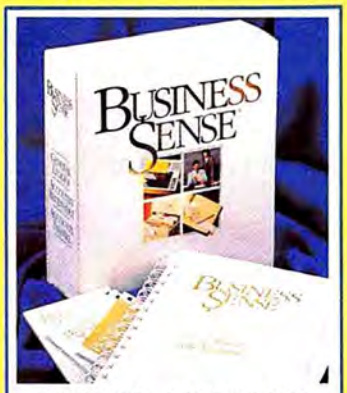

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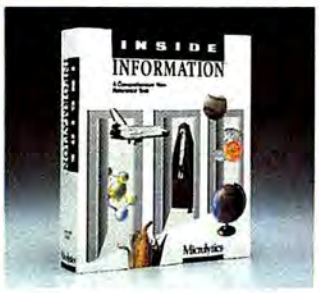

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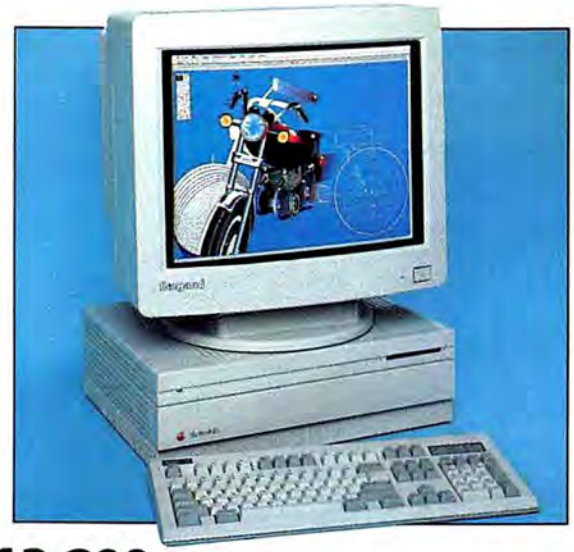

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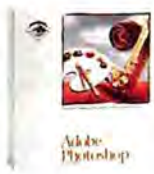

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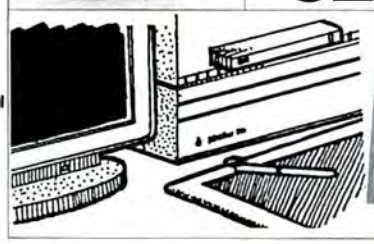

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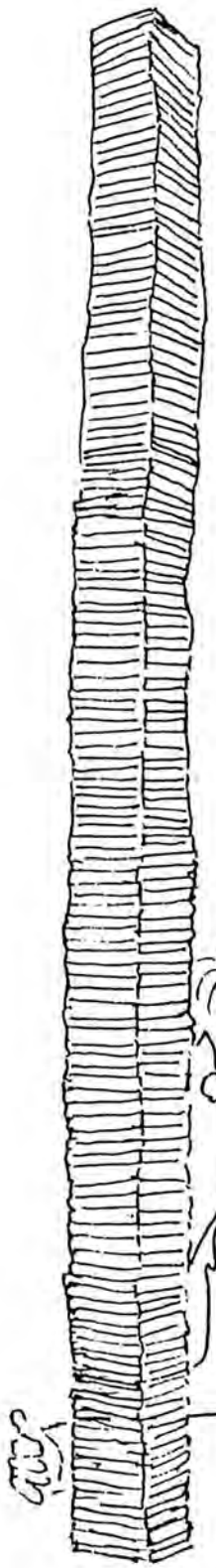

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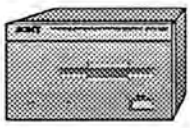

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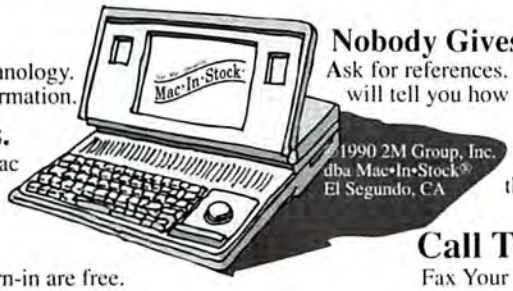

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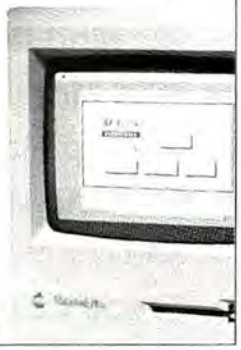

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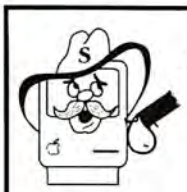

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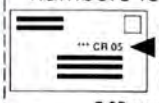

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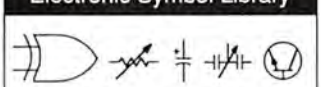

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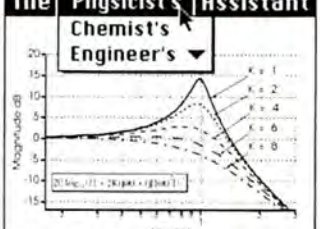

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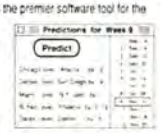

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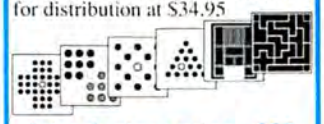

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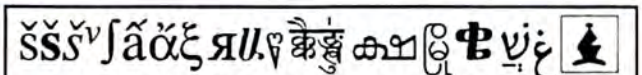

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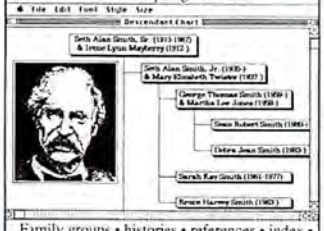

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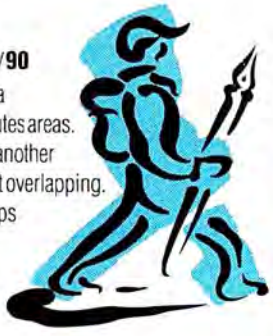

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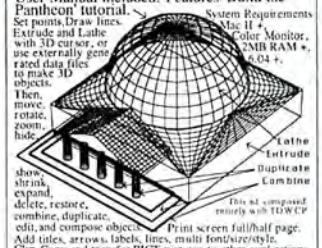

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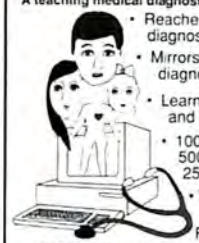

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Months have passed since the introduction of the IBM PS/1 and the newest Tandy 1000 machine. These weenie computers are designed for the mysterious "home" market — a market whose existence nobody can prove.

It was more than a decade ago that observers realized there is no such thing as a home computer — just work-at-home computers.

A home computer is supposed to do things relating to the home. The newest weenie, the Tandy 1000 RL, is a case in point.

According to the promotional material, the machine comes with 30 "select recipes" from the *New Good Housekeeping Cookbook*. Thirty recipes! Big friggin' deal. A McDonald's burger palace has a bigger collection of recipes than this.

Now I think taking *all* the *New York Times* cookbooks and putting them on a searchable CD-ROM disc would be worth doing. If you like to cook, then you like lots of resources. A mere 30 recipes doesn't cut it — neither does 3,000. Give me 300,000 recipes, and now you're talking. A weenie computer can never handle anything such as this.

When I asked some Tandy people about this machine, I kept getting the feedback that this is the machine everyone's wife wants. Oh no! The woman's computer for stereotypes! Apparently someone at *Ladies' Home Journal* likes the thing too. This notion should get the feminist power users rankled. The 1000 RL makes schedules, laundry lists, travel plans, and shopping lists. There is a calculator, a text editor, a drawing program, and some games. I give Tandy credit for loading it up with applications that are genuinely (and dubiously) aimed at this nebulous home market. I suppose some officious retentive supermom living in a meticulously clean suburban home outside of Des Moines might like this thing. I mean, it even has a "meal planner." Can you imagine? "... Next Wednesday, leg of lamb with canned peas and Jell-O with sliced bananas for dessert."

Let's move to the IBM PS/1. It's designed to be a tax write-off. It's definitely aimed at work-at-home types, with a wink-wink nudge-nudge sales pitch. I think IBM's real hope is that PS/1 users will subscribe to the funky Prodigy on-line service. Its "home" orientation isn't as sincere as Tandy's.

It's a weenie machine nonetheless.

All these weenie machines are earmarked by a pseudo-iconic front end. The PS/1 has a moronic opening screen with four huge windows. You click with the mouse in one of them, and off you go. "Just like a Mac, huh?" someone asked me. The 1000 RL front end is much like a Mac's, except it's more cluttered.

I'd hate to continue this discussion without mentioning the Headstart Explorer, the forerunner of these machines, announced late last year in a fancy Leonard Nimoy-hosted superevent at the Hayden Planetarium. I haven't seen the machine since. It was a home computer aimed at kids who needed help with their schoolwork.

We also can't ignore the PCjr, the first real bust in this market. With predicted sales of 350,000 in its first year and a predicted consequent decimation of Western civilization as we know it, it fizzled.

Oops, wasn't the Atari 800 a home computer too? Wasn't the Apple II a home computer? And let's not forget the $200 Commodore 64, the closet computer. And who knows what Nintendo is up to?

With more than 80 million households, the manufacturers are convinced that there is some way to sell home computers. There has to be, dammit! They try to sell them for games; for recipes; for meal planning; for mundane work-at-home projects; for homework; as grandiose calculators; and as a way to access cheap, useless databases. They see the formula as simple. First, the machine must be, in Tandy CEO John Roach's words, "idiot-proof." This is a dubious market to cultivate — idiots. How can you brag about your products when they're designed for idiots? What can you say? "Our customers are idiots!" "Only idiots buy our products!" It doesn't work.

Still, it seems the weenie machines *are* designed with idiots in mind. Now, don't get me wrong — you don't have to be an idiot to use one. But because they are idiot-proof, some lowest-common-denominator decisions have to be made to accommodate idiots. In many ways, the machine turns the user into an idiot. Use an idiot-oriented machine, and you can feel like an idiot — and then become one.

This is the problem with these machines. If you know anything about computers — and knowing about computers *is* the future, ask a 12-year-old — you don't want a weenie machine. And you don't want to feel like an idiot.

I guess all this nonsense, the home market and all, is based on the adage that nobody ever went broke underestimating the intelligence of the American public. Wanna bet?

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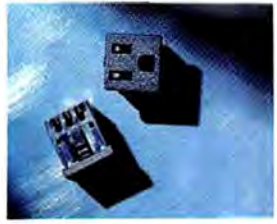

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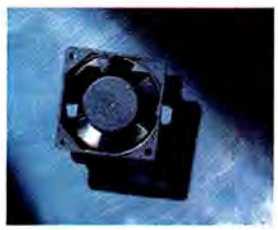

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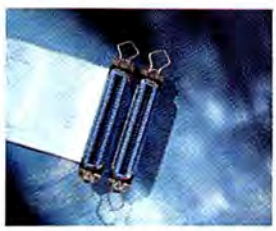

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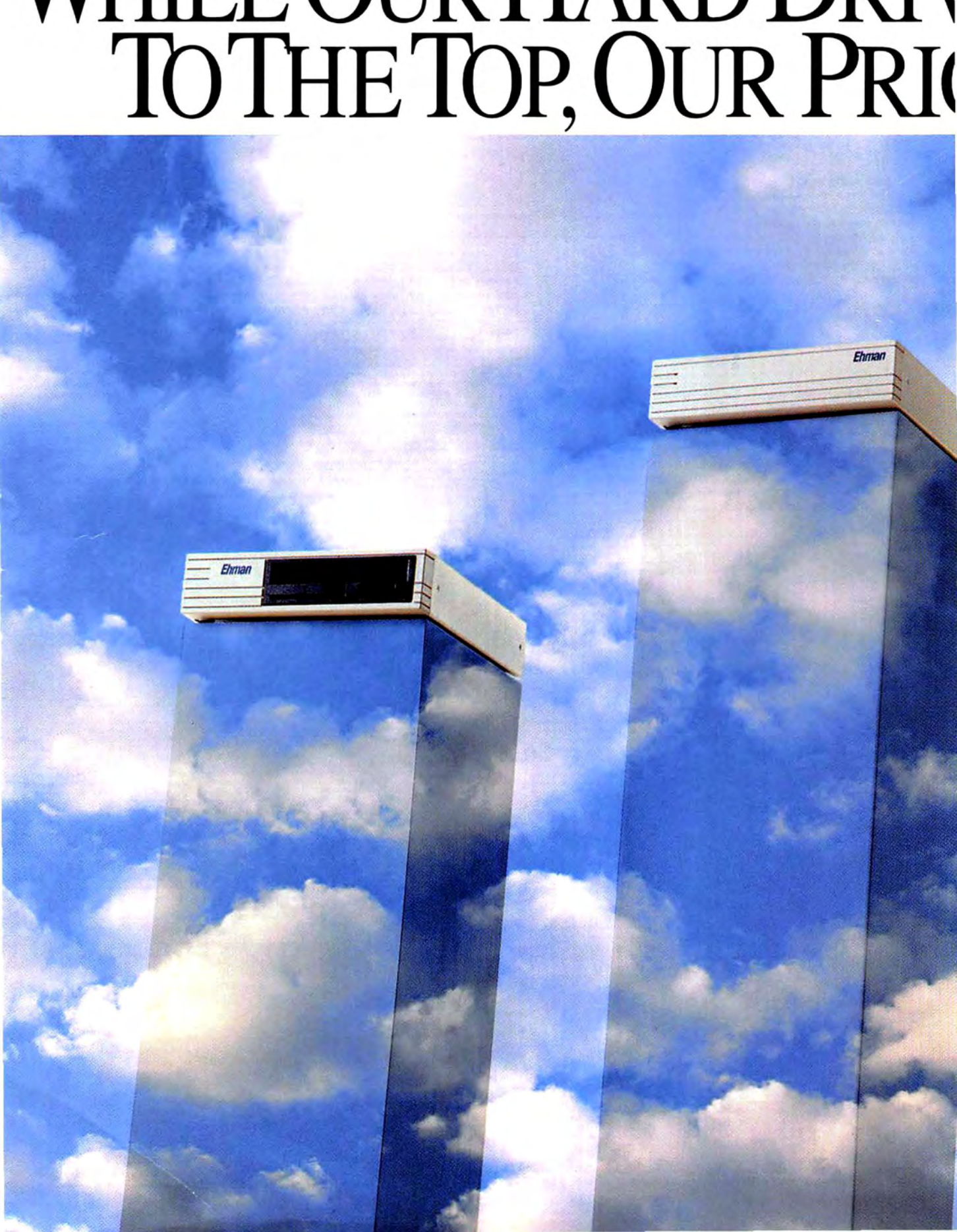

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Even when everything else is down, you're up. The Series 300 external Management Bus operates outside of the rest of the network, giving your Macintosh data about the network even when a network is down. StarCommand™ software monitors port status automatically, and notifies the manager about problems for both LocalTalk and Ethernet networks. Plus, you get network diagnostics and traffic analysis.

LEDs provide a reliable way to shed light on port status and signal quality. The Series 300 detects jamming, automatically removes malfunctioning nodes from the network, and puts them back when the problem is cleared. It's the only hub that reports noise problems. The Series 300 delivers lots of data about each port, and even maintains port status during power failures.

When you're down to the wire, the Series 300 works reliably with twisted pair, quad cable or 25-pair cable. Which means you can build a reliable network in any building anywhere. The Series 300 amplifies and repeats LocalTalk signals over 12 ports, up to 48 offices. Each port will support 3,000 feet of cable to Apple computers and peripherals, and other LocalTalk-compatible devices.

A name you can rely on for reliable networks Farallon invented networks over telephone wire. Easy installation, economy and reliability have made the PhoneNET System the standard for AppleTalk networks. And our technical support is widely recognized as the best in the business. No wonder there are more than a million PhoneNET nodes installed.

Reliability has its mark. Our first generation of StarController hubs is still performing reliably for over 400,000 users—with less than 1% failure in three years. The PhoneNET® System logo is your assurance that the Series 300 will perform to specifications. It guarantees that the Series 300 is compatible with the entire PhoneNET System family of network products, including the StarController™ EN for use on Ethernet networks. And it assures you of extensive, high-quality documentation on network design, technical specs, and management and troubleshooting help.

For the name of the Farallon dealer nearest you, call Customer Service at (415) 596-9000. Dealers call our Reseller Hotline 1 (800) 344-7489 in U.S. and Canada.

Farallon™

The Personal Communications Company™

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